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"STARTER HOMES" PROJECT:
COST-EFFECTIVE SITE PLANNING

Ontario Ministry of Housing
Policy and Programs Development Branch

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more livable housing
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INTRODUCTION

Since a major component of the price of new homes is the cost of their lots, two major means of reducing the price of new homes are

1. to put houses on less land, and
2. to reduce the costs of servicing land developed for housing.

The Ontario Ministry of Housing's 1976 study, Urban development standards. A demonstration of the potential for reducing costs, concluded that more cost-effective proposed site servicing and site layout standards would significantly reduce the price of an average house lot in Ontario (by between \$6000 and \$8000 [1976]). Almost 75% of these potential savings could be effected by better site layout, and the remaining 25% by more cost-effective site servicing techniques (Urban development standards, pp. i-ii). Putting more dwelling units on less land is clearly, then, the single most effective means of reducing the cost of new housing, provided that developers pass on this reduction in cost to consumers.

1. ALTERNATIVE DESIGN FOR HIGHER DENSITY,
MORE LIVABLE HOUSING

Alternative housing forms

Most new housing built in Ontario falls into four housing forms:

- detached
- semi-detached
- townhouses
- multi-storey apartments.

These forms, however, are not necessarily the most successful in providing livable, cost-effective housing. Detached and semi-detached houses with conventional lot line setbacks require too large lots, and too often townhouses and apartments are built to designs which detract from their livability.

Several alternative housing forms promise more livable dwellings, with desirable features similar to detached houses (access to ground, strong unit identity, private space) but allowing cost-effective higher densities:

Linked houses. These units are similar to semi-detached houses and row houses in that several units are structurally linked, but they appear much more like detached houses than conventionally designed semi-detached or row housing. Units are linked, for example, at garages. The elevations of the houses and their exterior treatment is designed to resemble more conventional detached houses, and individual units are varied in design and thus given strong individual identity. Housing in this form can be built on lots as narrow as 8 m, and can provide densities of 25 to 40 units per hectare (CMHC, Residential site development advisory document, 38).

Multiplexes. These housing forms are similar to semi-detached houses, but include more units. Multiplex forms may include from three to eight units in one building, but each has an identifiable direct access to ground similar to that of detached housing forms. Achieved densities of this form can reach 50 units per hectare (CMHC, Residential site development advisory document, 39).

Low-rise apartment buildings. Multi-unit forms which are no higher than four storeys offer more design flexibility and more innovative solutions to livability problems than conventional multi-storey forms, and still achieve much higher densities than detached and attached

forms. CMHC recognizes two generic types of this form: stacked townhouses (resembling conventional block townhouses but with one or more units above the unit at ground level), and garden apartments (attached units without long corridors, often each with direct access to ground by a staircase, and with generous balconies for higher units). Each of these forms reaches densities between 50 and 200 units per hectare (CMHC, Residential site development advisory document, 42).

Whether each of these forms provides attractive, more livable housing which solves problems associated with higher density depends, of course, on the effectiveness of their design. These forms, however, seem to offer many more possibilities for innovative improvements of livability.

Other innovative treatments of more conventional forms have also been successful at producing better dwellings on less land--for example, back-to-back townhouses and "checker-board" attached housing (see examples in CMHC, Residential site development advisory document, 41). Row- and other attached housing forms which are simply better designed have achieved the same effect. Discussion of these, however, belongs more properly to a treatment of housing unit rather than site layout.

Alternative site layouts

The obvious solution to creating higher densities and reducing lot costs are multi-family housing forms. Alternative site layouts, however, have also been developed for single-family detached housing which use less land per unit and thus lower costs. These innovative site layouts may be categorized into three groups:

- smaller lots
- zero lot line
- cluster

These categories are not exclusive of each other--for example, both cluster and zero lot line developments usually put houses on lots smaller than those of conventional detached house developments--but they represent three distinct proposed means to increase density.

2. SMALLER LOTS

Most conventional zoning ordinances regulating the development of detached housing require minimum setbacks between lot lines and house exteriors and minimum ratios between lot area and dwelling unit area. Many criticisms have been raised, however, by both the public and private sectors in both Canada and the U.S., that such standards are excessive. It is claimed that livable detached housing can be built on much smaller lots, and that excessive lot size standards contribute to housing costs which put new housing out of reach of many consumers.

The most direct remedy to such excessive standards is to reduce them. Two thorough and important Canadian studies addressed this possible solution in the mid-70s: from the perspective of the public sector, the Ontario Ministry of Housing's Urban development standards. A demonstration of the potential for reducing costs (Toronto: 1976), and, from the perspective of the private sector, the Urban Development Institute's Lowering the cost of new housing (Ontario: 1976). Both studies proposed hypothetical alternative developments of a large tract of land which used either conventional site and servicing standards or more cost-effective alternative standards.

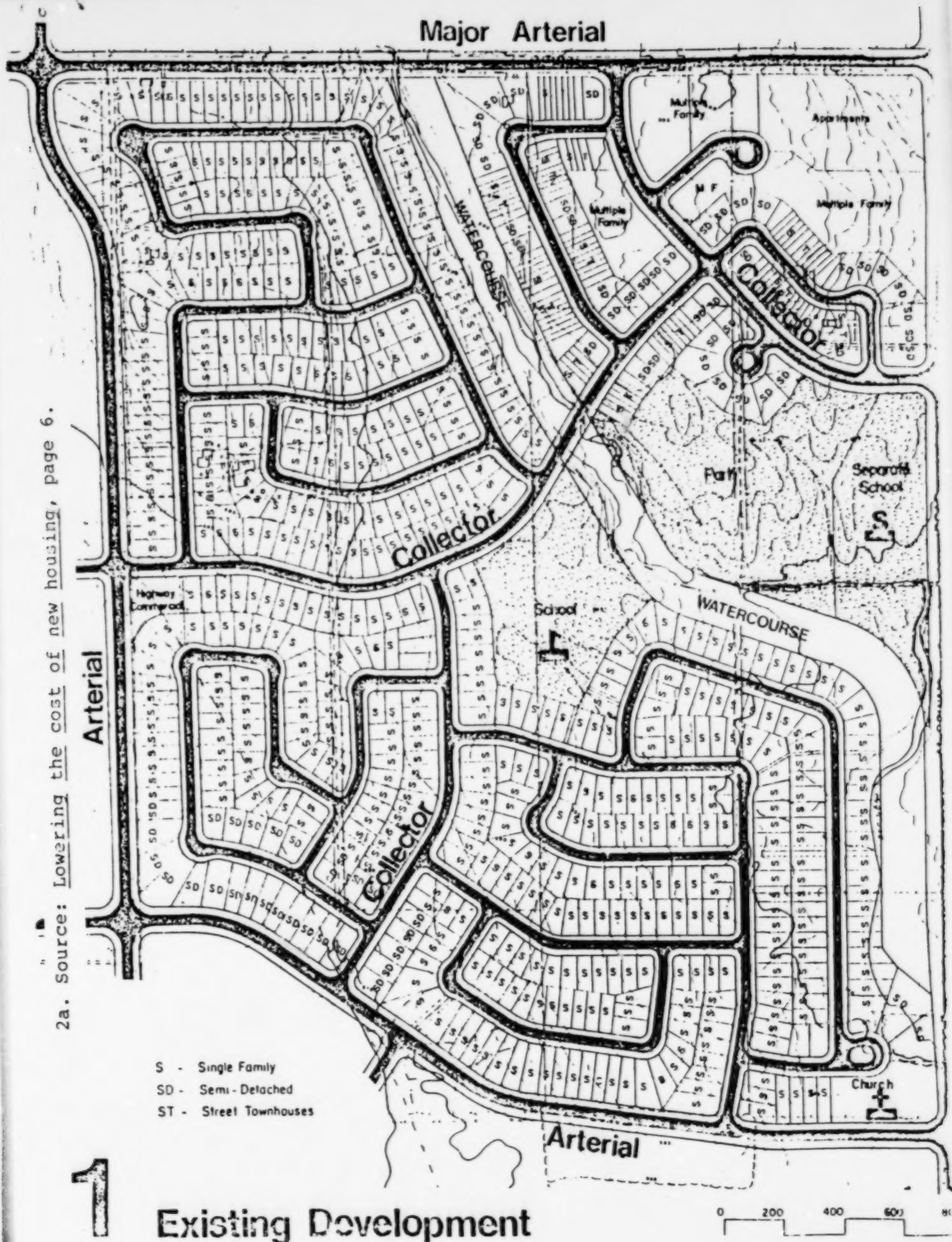
Both studies propose smaller lots for detached houses. The studies also propose a higher proportion of multiple-family housing forms, alternative servicing standards and techniques, and (in Lowering the cost of new housing) more cost-effective housing unit design, so the potential savings of the alternative developments cannot be attributed only to smaller lots. Smaller lots for detached housing, however, remain a significant cost-reducing feature of the proposed developments.

Illustrations:

From Lowering the cost of new housing:

- 2a. A plan showing the existing development of a 200 acre site using conventional lot size and housing mix.
- 2b. A plan of the same 200 acres showing more cost-effective alternative site design and more higher density housing forms.
- 2c. A summary of site statistics for both plans.

2a. Source: Lowering the cost of new housing, page 6.



Major Arterial

Arterial

Major Arterial

2b. Source: Lowering the cost of new housing

- Q - Quadruplex
- S - Semi-Detached
- D - Duplex
- GH - Group Housing
- P - Parkette
- ... - Pedestrian System
- HC - Highway Commercial

WATERCOURSE

Separate School

WATERCOURSE

School

Apartments

Collector

Church

Arterial

Theoretical Development

0 200 400 600 800

Figure 1
Existing Plan

Site Statistics

Type of Units	No. of Units	Population
Single Family	594	50% 2257
Semi-Detached	144	12% 547
Street Townhouses	100	8% 380
Multiple Family	120	10% 456
Apartments	240	20% 720
Total	1198	4360

Length of Street 6,400'

Acreages

Residential Single Family - Semi Detached	106.5
Street Townhouses	6.1
Multiple Family	8.0
Apartments	4.0
Schools	12.1
Parks	10.0
Watercourse	12.8
Church-Highway Commercial Roads	2.0
	38.5
Total	200.0 AC

Unit Gross Density 6.0 u.p.a.
Population Gross Density 21.8 p.p.a.

Unit Net Density 9.6 u.p.a.
Population Net Density 35.0 p.p.a.

Park Dedication 5%

Figure 2
Hypothetical Plan

Site Statistics

Type of Units	No. of Units	Population
Semi-Detached	466	14% 1631
Quadruplex	616	19% 2156
Duplex	396	12% 1386
Group Housing	1322	40% 4627
Apartments	511	15% 1278
Total	3311	11,078

Length of Street 5,750'

Acreages

Residential Semi-Detached, Quadruplex, Duplex	108.8
Apartments	10.4
Schools	13.3
Parks	27.6
Watercourse	12.8
Commercial Roads	1.0
	26.1
Total	200.0 AC

Unit Gross Density 16.6 u.p.a.
Population Gross Density 55.4 p.p.a.

Unit Net Density 30.4 u.p.a.
Population Net Density 101.8 p.p.a.

Park Dedication 1 acre for 120 units

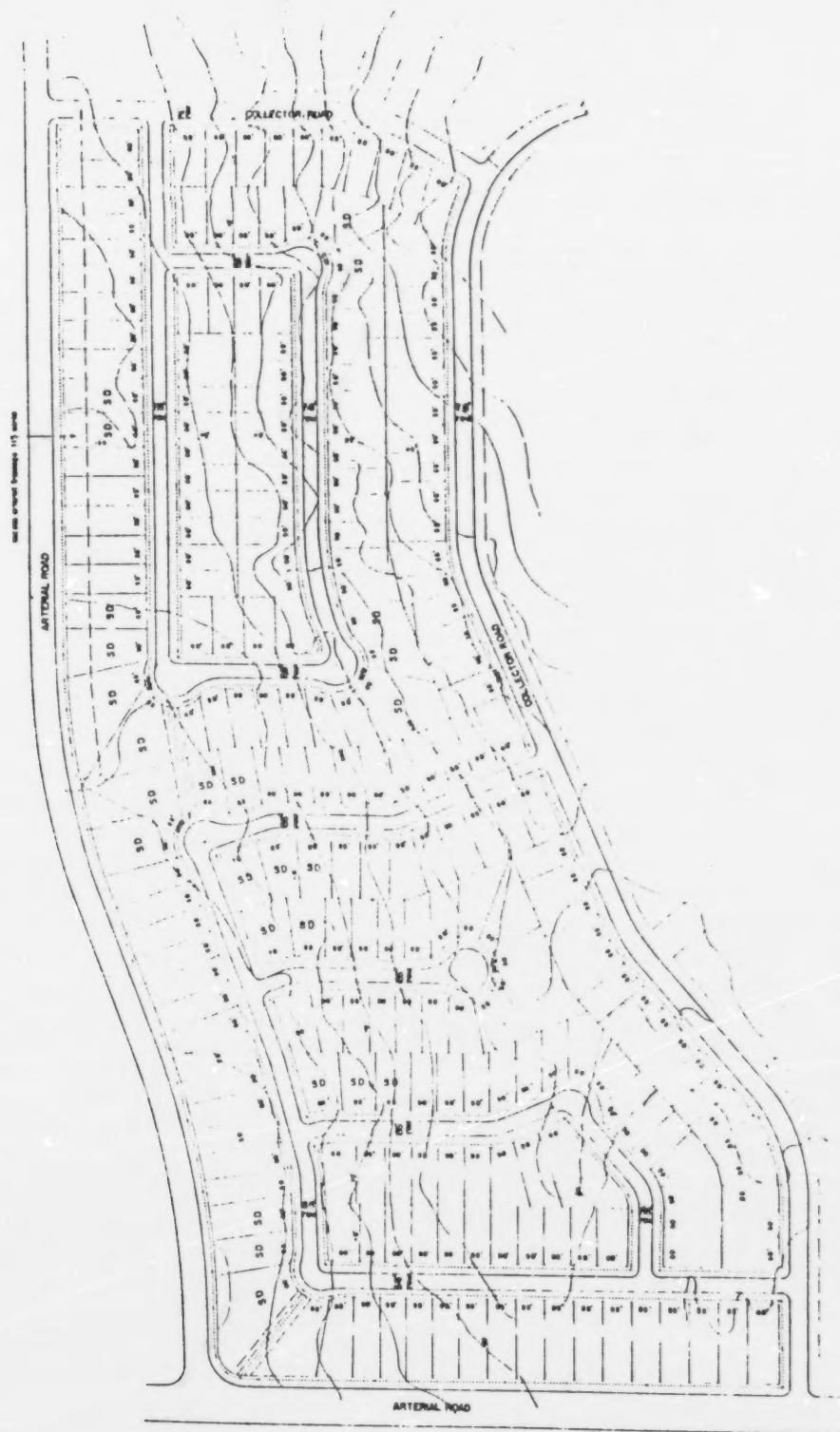
2c. Source: Lowering the cost of new housing, page 5.

From Urban development standards:

The Ontario study proposes two sets of development standards, one for lower density, smaller Ontario communities (called "Ontario" standards) , and another for higher density urban communities in Ontario (called "metropolitan" standards). Four plans of the same site are illustrated: the "Ontario conventional" plan shows the site developed according to site layout conventions in a typical smaller community; the "metropolitan conventional" plan shows the same site developed according to site design conventions in a typical higher-density Ontario urban community; alternative plans are given showing the site developed according to more cost-effective proposed lot size and site design standards.

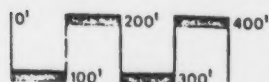
- 2d (i,ii,iii, iv). The four alternative plans of a 50 acre site.
- 2e. A summary chart comparing conventional and proposed densities.
- 2f. A summary chart comparing housing units, population, and land use.
- 2g. a summary chart of potential cost reductions of proposed standards.
- 2h. Appendix B, which summarizes and compares conventional and proposed site planning standards (six pages).

Another important resource for alternative small-lot subdivision design is the Ontario Ministry of Municipal Affairs and Housing's Residential site design alternatives in small communities (September 1981), which shows four alternative developments of the same site--one to conventional standards, and the others to standards proposed by Urban development standards. Site servicing and road construction costs per unit are estimated for each design. Because the entire resource is useful, and because it is readily accessible, no illustrations from it have been reproduced here.



	UNITS	%
SF - Single Family	60' S. F. 21	8.0
SD - Semi Detached	55' S. F. 53	20.0
	50' S. F. 137	52.0
-----sidewalk	70' S. D. 4	2.0
	65' S. D. 48	18.0
	263	100.0

plan1 ontario conventional





SF - Single		UNITS	%
Family	40' S. F.	100	24.0
SD - Semi	35' S. F.	132	32.0
Detached	30' S. F.	100	24.0
sidewalk	26.5' S. D.	42	10.0
	30' S. D.	40	10.0
		414	100.0

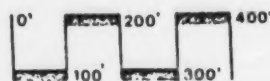
plan 2 ontario proposed





		UNITS	%
SF - Single	55' S F	17	5.0
Family	50' S F	42	12.5
SD - Semi	45' S F	110	32.5
Detached	40' S D	4	1.0
LINK - Link	30' S D	66	19.0
Housing	30' LINK	33	10.0
STH - Street	20' S T.H.	68	20.0
Townhouse		340	100.0
.....sidewalk			

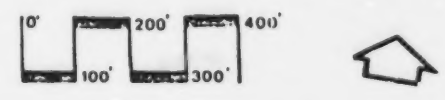
plan 3 metropolitan conventional





		UNITS	%	
SF Single	40'S F	51	100	50%
Family	35'S F	50	100	
SD Semi	30'S F	150	300	
Detached	35'S D	30	60	20%
LINK Link	30'S D	72	140	
Housing	28'S LINK	50	100	
STH Street	20'STH	52	100	
Townhouse	18'STH	52	100	
sidewalk		507	100.0	

plan 4 metropolitan proposed



SUMMARY OF SUBDIVISION PLANS (50 ACRES RESIDENTIAL)

	ONTARIO			METROPOLITAN		
	CONVEN.	PROPOSED*	% CHANGE	CONVEN.	PROPOSED*	% CHANGE
NET (LOT) DENSITY** (u.p.a.)	6.46	12.42	92	9.31	17.04	83
GROSS DENSITY (u.p.a.)	5.36	8.37	56	6.93	10.36	50
AREA (ACRES)						
-gross area	49.10	49.44	-	49.10	48.97	-
-residential (net lot area)	36.52	33.31	-	36.52	29.76	-
-roads & emerg. access	12.58	14.09	-	12.58	16.27	-
-communal amenity space	-	2.04	-	-	2.94	-
UNITS						
-single detached	211	332	58	169	251	49
-semi detached	52	82	58	70	102	46
-link	-	-	-	33	50	52
-street townhouse	-	-	-	68	104	53
-Total	263	414	58	340	507	49
AVG. LOT AREA/UNIT (SQ. FT.)	6743	3507	48	4679	2556	45

* *Comprehensively planned development*

** *Based on one lot per unit*

SUMMARY OF 200 ACRE SITE

	ONTARIO		METROPOLITAN	
	CONVENTIONAL	PROPOSED	CONVENTIONAL	PROPOSED
TOTAL HOUSING UNITS	964	1478	1244	1806
POPULATION	3470	5320	4480	6502
LAND USE (ACRES)				
-residential	180.0	176.5*	179.6	174.4**
-school	11.3	14.2	9.2	14.2
-park	8.7	9.3	11.2	11.4
-Total	200.0	200.0	200.0	200.0
NET (LOT) DENSITY (u.p.a.)†	6.46	12.42	9.31	17.04
GROSS DENSITY (u.p.a.)	5.36	8.37	6.93	10.36

Includes 6.86 acres of communal amenity space

** Includes 9.95 acres of communal amenity space*

Excludes communal amenity space

SUMMARY OF COST SAVINGS (FULL 200 ACRE NEIGHBOURHOOD)

	ONTARIO		METROPOLITAN	
	CONVENTIONAL (\$000)	PROPOSED (\$000)	CONVENTIONAL (\$000)	PROPOSED (\$000)
RESIDENTIAL SERVICING	6,185	5,698	6,565	6,172
OTHER SERVICING	872	1,589	876	1,996
LAND VALUE (LESS SCHOOL)	6,666	6,570	19,485	19,215
MUNICIPAL LEVIES	1,368	1,882	1,648	2,211
OTHER COSTS @25%	3,872	4,059	7,317	7,647
	—	—	—	—
TOTAL COST	\$18,963,000	\$19,798,000	\$35,891,000	\$37,241,000
NO. OF UNITS	964	1478	1244	1806
COST/UNIT	\$19,671	\$13,395	\$28,851	\$20,620
	$\underbrace{\hspace{10em}}$		$\underbrace{\hspace{10em}}$	
REDUCTION/UNIT	<u>\$6,276</u>		<u>\$8,231</u>	

2g. Source: Urban development standards, page 52.

Appendix B.

Site Planning Standards

This Appendix contains the complete set of all site planning standards used for four designs, together with a fifth set indicating the minimum standards which could be practical for developments without comprehensively planned development (C.P.D.) procedures being required. From our studies relating to the four designs prepared, the standards apply to the following approximate densities:

	<u>net (lot) density</u> <u>units per acre</u>	<u>gross density</u> <u>units per acre</u>
conventional - Ontario	6	5
- Metropolitan	9	7
non-C.P.D.	10	7
proposed - Ontario	12	8
(C.P.D.) - Metropolitan	17	10

The justification for most of the standards used has been discussed in the main text of the report. Our rationales for the remaining standards are discussed in footnotes at the end of the following table.

* Net residential area is lot area excluding streets, school and all park areas.

ITE PLANNING STANDARDS

STANDARD	CONVENTIONAL		PROPOSED GUIDELINES		
	ONTARIO	METRO	NON C.P.D.	ONTARIO (C.P.D.)	METRO (C.P.D.)
HOUSING MIX:					
-single detached	80%	50%	70%	80%	50%
-semi detached	20%	20%	10%	20%	20%
-link house	-	10%	10%	-	10%
-street townhouse (attached housing)	-	20%	10%	-	20%
PUBLIC OPEN SPACE					
-n'hd. & community park (ac/1000)	2.5	same	2.5	1.75	same
-local housing park or communal amenity space (C.A.S.)*	-	-	-	.75	same
			Total 2.5		
SCHOOL SITE AREAS:					
-public high schools	18 acres	15 acres	15 acres	same	same
-public junior high schools	10 acres	8 acres	8 acres	same	same
-public elementary schools	6 acres	5 acres	5 acres	same	same
-separate high schools	7 acres	6 acres	6 acres	same	same
-separate elementary	4 acres	3 acres	3 acres	same	same
MINIMUM LOT AREA - WIDTH AND DEPTH					
-single detached	5500 50x110'	4950 45x110'	4000 40x100'	3000 30x100'	2400 30x80'
-semi detached (1 unit)	3575 32.5x110'	3300 30x110'	3000 30x100'	2650 26.5x100' (20.5'unit)	2400 30x80' (24'unit)
-link house (average incl. wider end lot)	3520 32x110'	3520 32x110'	3200 32x100'	2600 26x100' (25'unit)	2360 29.5x80' (28.5'unit)
-street townhouse (average incl. wide end lot)	2420 22x110'	2420 22x110'	2200 22x100'	2100 21x100' (20'unit)	1520 19x80' (18'unit)

* CAS term adopted from CMHC use

TE PLANNING STANDARDS (CONT'D)

STANDARD	CONVENTIONAL		PROPOSED GUIDELINES		
	ONTARIO	METRO	NON C.P.D.	ONTARIO (C.P.D.)	METRO (C.P.D.)
<u>MINIMUM YARD DISTANCE</u>					
<u>Front Yard</u>					
-to habitable	25'	20'	15'	10'	10'
-to living room	25'	20'	20'	15'	15'
-to garage or carports with sidewalks	25'	20'	20'	20'	20'
-to garage or carport without sidewalk	25'	20'	20'	14'	14'
<u>Rear Yard</u>					
-to living room principal window	25'	same	35'	25' with privacy screening (35' w/o)	
-to habitable room other than living room principal window	25'	same	35'	18' with privacy screening (35' w/o)	
-lot backing onto arterial	65'	same	65' with privacy screening	65' with privacy screening	65' with privacy screening
<u>Side Yards</u>					
-internal side yards both sides	4'+2' for each storey or partial storey above the first storey (1)		4'+2' for each storey or partial storey above the first storey		
-zero side yard with maintenance assessment	not permitted	not permitted	not permitted	permitted	permitted
-flankage yard on corner lot	15'	15'	15'	4'+2' etc with privacy screening to exposed rear yard to street	4' with privacy screening to exposed rear yard to street

See Explanatory Notes at conclusion of Appendix B

ITE PLANNING STANDARDS (CONT'D)

STANDARD	CONVENTIONAL		PROPOSED GUIDELINES		
	ONTARIO	METRO	NON C.P.D.	ONTARIO (C.P.D.)	METRO (C.P.D.)

MINIMUM FLOOR AREA & ESTIMATED COVERAGE FOR DWELLING UNITS (excl. garage & basement) sq. ft.

	Bldg. Area	Cov.	Assumed Bldg. Area	Cov.	
-single detached					
1 storey	1000-1000	same	1000- 1000	same	same
1½ storeys	1200-var.	same	1000- var.	same	same
2 storeys	1400-700	same	1000- 500	same	same
-semi detached					
1 storey	1000-1000	same	1000-1000	same	same
1½ storeys	1000-var.	same	1000-var.	same	same
2 storeys	1300-650	same	1000-500	same	same
-link house					
2 storeys	1300-650	same	1000-500	same	same
-street townhouse					
2 storeys	1400-700	same	1000-500	same	same

MAXIMUM LOT COVERAGE

-single detached	35%	same	N.A.	N.A.
-semi detached	35%	same	N.A.	N.A.
-link house	35%	same	N.A.	N.A.
-street townhouse	40%	same		

MINIMUM LANDSCAPED OUTDOOR LIVING AREA (OLA) ADJACENT TO DWELLING (Sq. Ft.)

N.A.	N.A.	½ gross finished floor area	same	same
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MAXIMUM LENGTH LOCAL STREETS (2)

-cul-de-sac	750' excluding bulb with 10' wide emergency access
-p-loop	2800' excluding entry leg with 10' wide emerg. access
-crescent	none stated

SITE PLANNING STANDARDS (CONT'D)

STANDARD	CONVENTIONAL		PROPOSED GUIDELINES		
	ONTARIO	METRO	NON C.P.D.	ONTARIO (C.P.D.)	METRO (C.P.D.)
10. CUL-DE-SAC AND OUTSIDE CORNER OF LOCAL STREET (3)					
-minimum turning circle at property line	60'R	same	50'R	same	same
-minimum turning circle at curb	45'R	same	35'R	same	same
11. PARKING SPACES					
-spaces per unit (off-street pavement)	2	same	2	same	same
-additional visitor parking spaces per unit on collector streets with parking one side only	0.5	same	0.5	same	same
-additional visitor parking spaces per unit on local streets with parking both sides on pavement of 26' or more	1	same	1	same	same
12. OFF-STREET PEDESTRIAN AND/OR EMERGENCY VEHICULAR ACCESS					
-vehicular right of way width	12'	same	12'	same	same
-vehicular pavement width	10'	same	10'	same	same
-pedestrian right of way width	10'	same	10'	same	same
-pedestrian pavement width	5'	same	5'	same	same
13. LOCAL STREET INTERSECTION SPACING (4)					
-general condition	200'	same	200'	same	same
-adjacent to intersections with arterials	150'	same	125'	same	same

Problems with smaller lots

Smaller lots for detached and semi-detached housing have been used for over a decade in Ontario. The reduction of area and setback standards proposed by Urban development standards were already in use in Ontario when that study was published in 1976. Two conclusions surface repeatedly in discussions of built small lot housing:

--much small lot detached housing is poorly designed. House-lot configurations are often simply scaled down versions of larger lot designs. A house-lot configuration on a larger lot which provided unit identity, privacy, and good outdoor living space may not preserve adequately any of these livability characteristics when simply scaled down.

--houses built for the lower-priced end of the new housing scale are now placed on lots small enough that they cannot be further reduced in size without significant reduction of livability, unless strongly alternative unit and lot designs are used.

These conclusions have led to the development of such alternative house-lot configurations and site layouts that increase density but retain or enhance the livability of individual housing units.

Three of these alternatives are set out in the following sections:

- innovative lot-street configurations
- zero lot line housing
- cluster developments.

3. INNOVATIVE LOT-STREET CONFIGURATIONS

Alternative lot shapes and lot-street configurations can provide more attractive and livable housing, while increasing effective density. Such alternatives also can reduce required street lengths, and thus servicing costs.

Illustrations:

- 3a, 3b. Five lot shapes described in CMHC's, Residential site development advisory document.
- 3c. A comparison of conventional and cost-effective alternative cul-de-sac designs.
- 3d. Another alternative cul-de-sac design.
- 3e, 3f. Three alternative street designs:
 - private street,
 - public eyebrow,
 - and one-way loop.

Fig. 26 *Narrow deep lots*, net density of 17 to 30 dwelling units per hectare. Perimeter yard housing, where some amount of yard space surrounds the dwelling on all sides, may be sited on long narrow lots, typically 7.5 m $\times$ 30 m [26]. The usual house form is a three-storey dwelling, separated from its neighbour but with minimal side-yard space between the two buildings. If a garage is provided, it is normally integrated with the first floor or with a semi-basement. This type of lot design makes efficient use of residential land, and the narrow street frontage reduces servicing costs. The repetition of identical narrow lots may be monotonous, but this effect can be relieved by mixing house types and by varying the distance between individual buildings and the street.

Fig. 27 Detached housing on 15 m $\times$ 20 m lots at 22 units/ha.

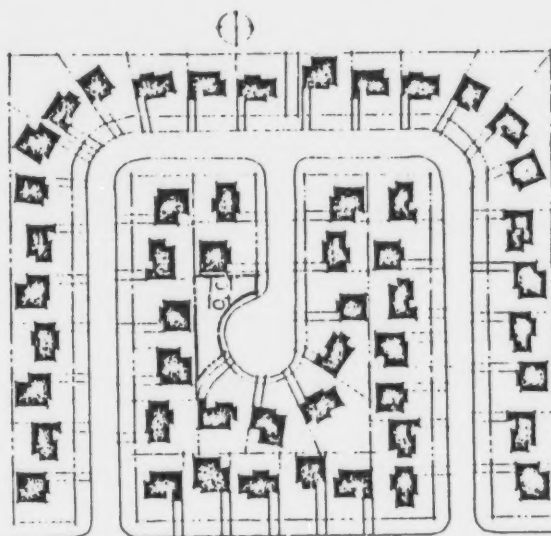


Fig. 26 Detached housing with side yards on 7.5 m wide lots at 30 units/ha.

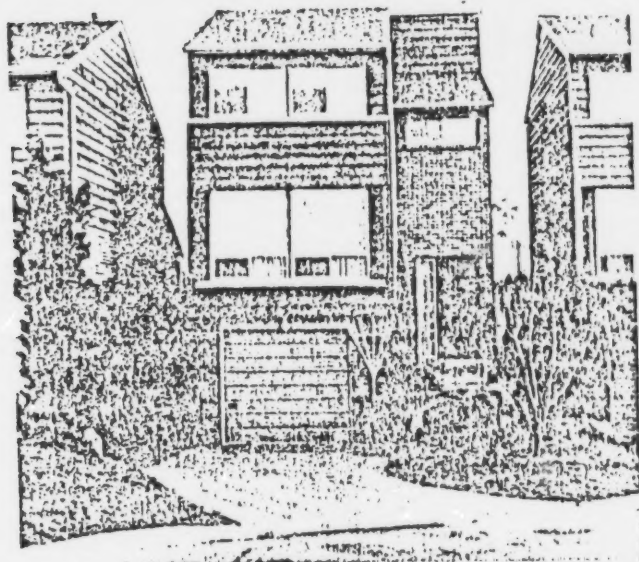


Fig. 28 *Wedge-shaped lots*. Wedge-shaped lots can be used with detached or attached house forms at the end of cul-de-sacs and with curvilinear street patterns. [28] Land is used efficiently and service costs are lowered where street frontages are narrow and rear yards are wide. This lot shape also can increase the amount of useable side yard space.

Fig. 28 Wedge-shaped lots at end of cul-de-sac averaging 400 m².

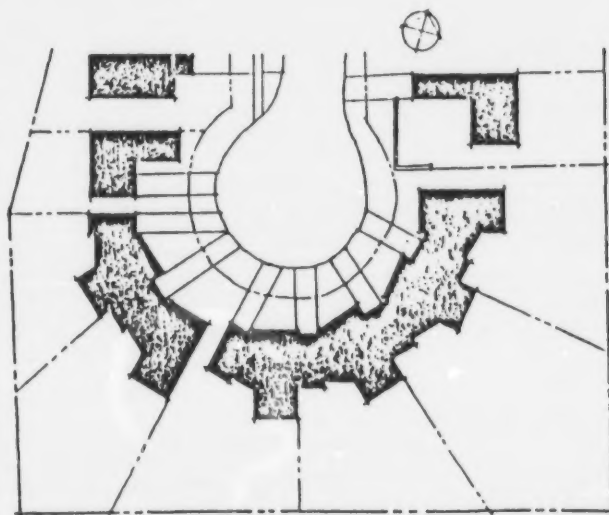


Fig. 27 *Wide shallow lots*, net density up to 30 dwellings per hectare. Sited on lots of approximately 15 m $\times$ 20 m, traditional single-family dwellings can be designed to make the best use of yard space. [27] Most of the lot, however, will be in the front yard, unless the municipality allows reduced setbacks from the street. This arrangement provides a reasonable design option at increased density; but because of the wide street frontage, it does not reduce servicing costs.

Fig. 29 Angled lots. Narrow, detached house forms can be given a more substantial "presence" on the street when angled lots are used.[29] This siting arrangement also creates a varied setback from the street without increasing service connection costs. An additional advantage to angled lot siting is that windows can be placed in side walls; when there is no narrow yard, it allows considerable variation in the use of the dwelling's interior spaces. The minimum front and rear yard setback requirements usually must be reduced in order to avoid excessively deep lots.

Offset lots. Staggered lot-lines can be employed to maximize the use of side yards without incorporating large separation spaces. The apparent visual size of the lot is increased, and at the same time all separation spaces are useable by residents.

Fig. 29 Angled lots contribute to varied streetscape.



Fig. 30 Angled offset lots. Through a combination of angled and offset lots, housing can be sited to provide maximum solar exposure and sheltered outdoor living areas on north-south streets. [30, 31]

Fig. 30 Angled offset lots.

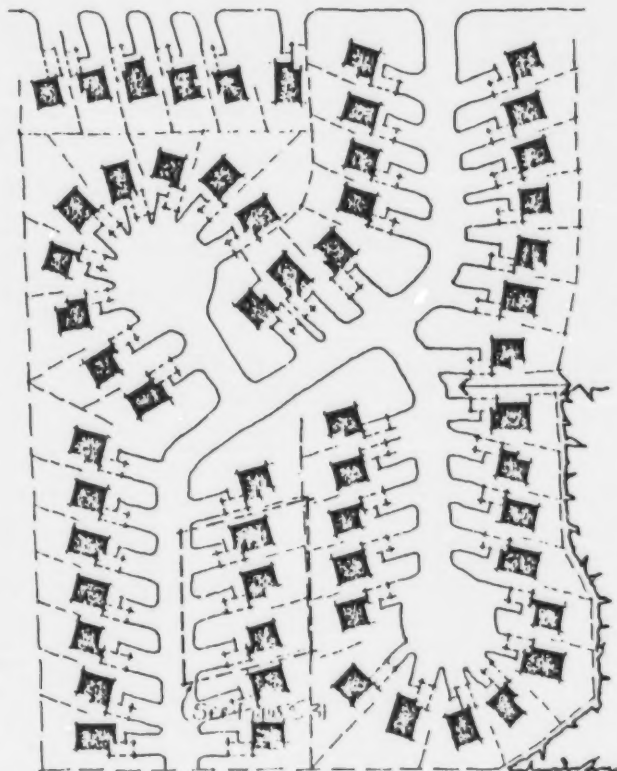
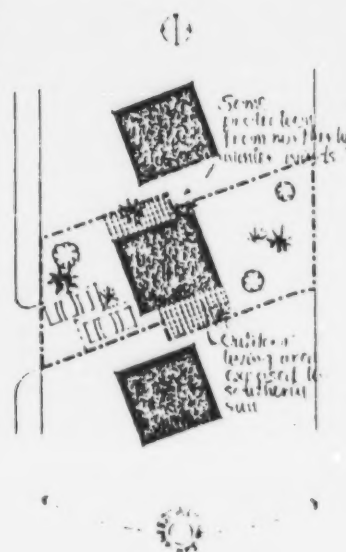
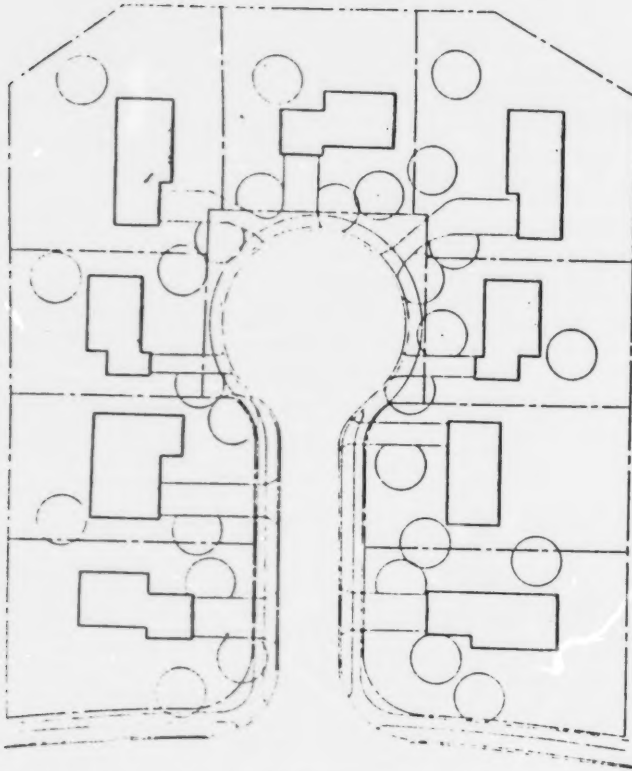


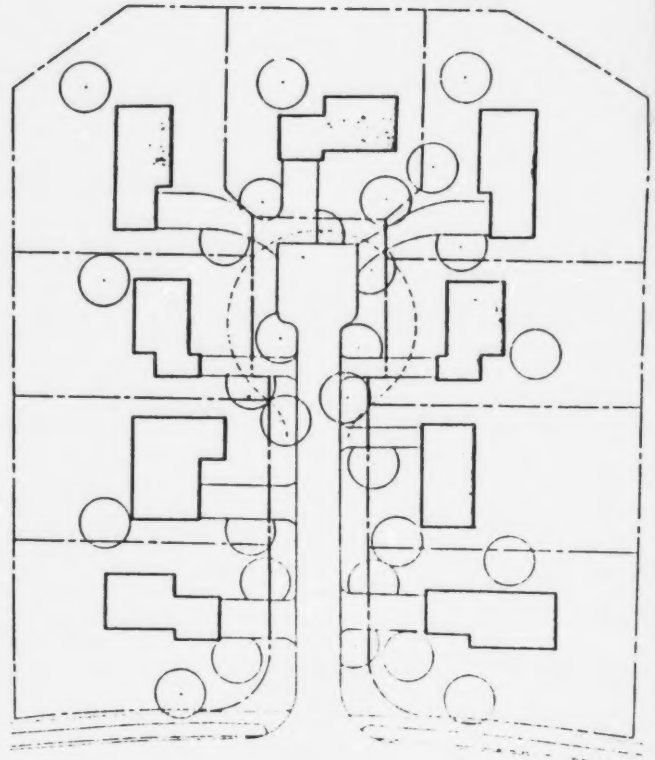
Fig. 31 Angled offset lots provide good solar exposure.





Streets & driveways 14,004 SF
 Sidewalks (4' wide) 2,980 SF
 Total Pavement 16,984 SF
 curb & gutter 775 LF

Conventional Cul-de-Sac



Streets & driveways 7,029 SF
 Sidewalks (4' wide) 1,020 SF
 Total Pavement 8,049 SF
 curb & gutter 280 LF

20-Foot Wide Cul-de-Sac Court

Construction Costs for Conventional Cul-de-Sac

14,004 s.f.	=	\$21,006 00
2,980 s.f.	=	\$8,195 00
775 l.f.	=	\$9,300 00
		\$38,501.00

Street & driveways
 (6" bituminous on
 4" gravel) @ \$1.50 s.f.
 Concrete sidewalk
 (4" slab on grade)
 @ \$2.75 s.f.
 Combination curb and
 gutter @ \$12.00 l.f.

Construction Costs for 20-Foot Wide Cul-de-Sac

7,029 s.f.	=	\$10,543 50
1,020 s.f.	=	\$2,805 00
280 l.f.	=	\$3,360 00
		\$16,708 50

3c. Source: Land Design/Research, and NAHB, Planning for housing, page 86.

ALTERNATIVE CUL-DE-SAC DESIGN

Reid, Crowther and Partners Ltd Consulting Engineers and Planners have devised an alternative to the conventional subdivision cul-de-sac design. The typical cul-de-sac provides many desirable urban design features such as a variety of lot sizes, rectangular or pie-shaped, quiet and privacy. Sometimes the privacy can be combined with the benefits of an adjacent park, lake or golf course.

However, cul-de-sacs also present difficulties: inefficient use of front and side yards, lack of on-street parking, siting problems on wedge-shaped lots, and some servicing difficulties. Reid, Crowther and Partners' new design addresses some of these problems. Their cul-de-sac plan is designed for better on-street parking, more efficient servicing, better use of land (more lots per acre) and more flexibility in house

design. The new design also allows a greater number of lots to back onto an amenity space. The diagrams below illustrate the alternative is slightly larger in area (less than one lot size) but it produces two additional lots.

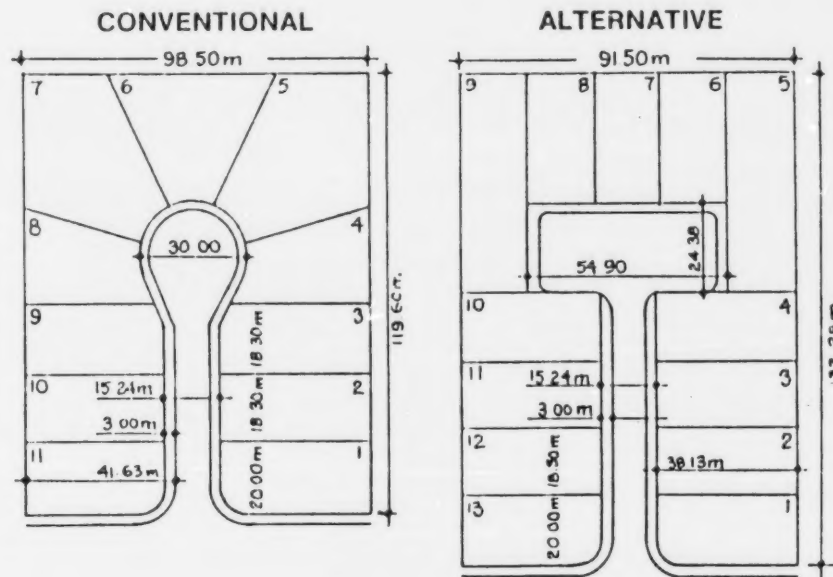
The research project compared the two design approaches by applying them to an actual development in Spruce Grove: Melcor Developments Ltd. had already prepared a preliminary design for cul-de-sacs backing on an existing golf course. The comparison indicated the alternative design increases access to the golf course, permits higher density and better return on investment. "If the return on

investment under the conventional system were retained as the maximum level of return, then the cost per lot under the alternative system would be lowered by \$2,000 to \$4,000 per lot or five to 10 per cent," concludes the report.

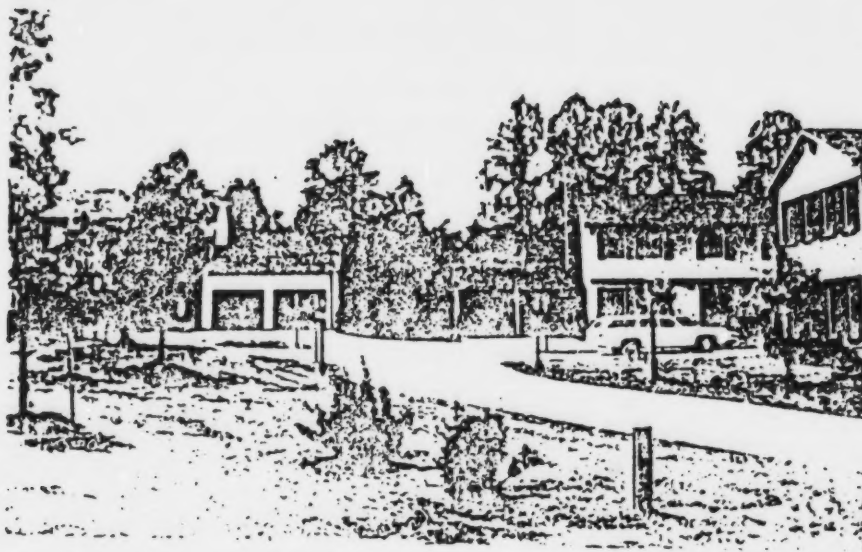
The research was prepared for the Planning and Research Branch of the Alberta Department of Housing under the Innovative Housing Grants Program. For more information contact:

Alberta Department of Housing
Research and Development Section
Planning and Research Branch
Fourth Floor
10050 - 112 Street, Edmonton, Alberta
T5K 2J1 427-8150

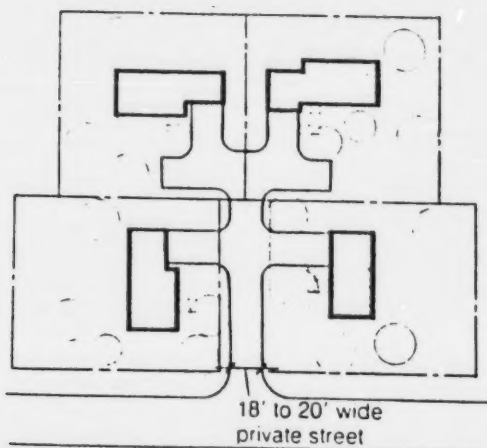
- Lots 5, 6 and 7 in the alternative design have front access to the amenity and two other lots have partial front access to the amenity.
- Lots 10, 11 and 12 in the alternative design have less area but a more efficient shape than lots 5 and 7 in the conventional design.



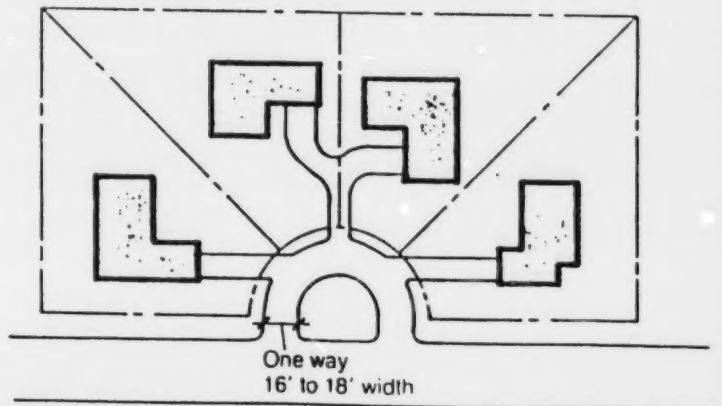
	CONVENTIONAL	ALTERNATIVE	VARIANCE
Total area	11780.6 sq. m.	12195.12 sq. m.	+414.5 sq. m.
Area of Right-of-Way	1584.0 sq. m.	2480.0 sq. m.	+896.0 sq. m.
Net Residential	10196.6	9715.12	-481.5
Pavement Area	1024.0	1737.6	+713.6
No. of Lots	11	13	+ 2
No. of Lots Backing onto Amenity	3	5	+ 2
Area of Corner Lot No. 5	1400.0 sq. m.	1068.4 sq. m.	-332.0 sq. m.



Examples of short, twenty-foot wide private streets



Private Street Layout



Public "Eyebrow" Layout

3e. Source: Land Design/Research, and NAHB, Planning for housing, page 87.



Example of 20-foot wide one way residential street in Baltimore, Maryland



4. ZERO LOT LINE DEVELOPMENTS

Under conventional site plan criteria, sensibly developed for detached houses on large lots, setbacks between each lot line and dwellings are required. As lot size is reduced, however, conventional setbacks lead to more and more unusable and unattractive space around houses. Houses are built to minimum setbacks, with the result that they sit in the middle of small lots with minimal side and back yards--unhappy caricatures of the yards of houses built in easier times.

Housing built to zero lot lines is the result of a re-thinking of the configuration of house and small lot. Rather than place a house in the middle of a lot, leaving four sides of (very little) open space, houses are built along one side of a lot, leaving more open space on three sides. The side yard becomes more usable. Zero lot line designs have been used to make small-lot houses more livable and more attractive, and have also been used to build houses on even less land (as little as 3500 sq.ft.) than is possible in developments designed with conventional setbacks. It is possible also to place zero lot line houses in a lot corner on two lot lines, leaving all unbuilt space on the lot more open for use.

Problems and solutions

With the increased density of zero lot line housing comes a set of problems. Some of these are common to all higher density housing developments, but are aggravated by the even higher densities possible with zero lot line site plans; some problems are particular to this form.

--Unit density and design may resemble row housing.

Municipalities, developers and consumers do not wish detached housing to resemble higher-density forms of row housing or street townhouses, but the close placement of zero lot line houses may lead to such perception. Proper design, however, can minimize this problem, providing each unit with a strong identity through techniques such as varied floor plans, varied elevations, different materials in facade treatments, and varied front setbacks. Short streets (including cul-de-sacs, which are readily adaptable to zero lot line housing) also minimize the visual impact and traffic problems of density. Streets should be scaled down in width to avoid domination of narrow front setbacks.

--Increased need for open space.

With more people and smaller lots, alternative means of providing more open space are required. Zero lot line configurations, of course, are an attempt to provide more private open space on a small lot, but for this attempt to be successful house unit designs must integrate indoor and outdoor space as well as possible. It is desirable to have the house open visually and physically to the private space on the lot, and to place interior living areas (kitchen, living room) adjacent to exterior living space.

Further, provision must be made for communal open space. One solution for larger zero lot line developments is to provide semi-private open space, space held in common by all owners of houses in the zero lot line development. This requires a legal agreement among the owners for provision of maintenance and control of use. Another solution is to site (require the siting of) zero lot line developments near public parks.

--Privacy.

As lots become smaller and units closer together, provisions for privacy become necessary. One design response involves placement of windows in adjacent units; another involves landscaping and enclosures. Many zero lot line designs and many zero lot line ordinances allow no windows on the sides of units overlooking other units' outdoor space; windows and doors open only to their unit's private space or to public space (the street). Enclosure of yards with fences, and plantings to function as visual and acoustic screens are necessary in zero lot line housing.

--Parking.

As density increases, more spaces for cars are required, but less land is available. Further, features of zero lot line design make provision of those spaces even more difficult: lots are usually less wide than conventional lots, so that 1. there is less curb per unit for on-street parking, and 2. if wide driveways and two-car garages are provided, they unattractively dominate the streetscape.

Several solutions are possible. Off-lot parking areas can be integrated into larger zero lot line developments, and landscaped to not detract from other open space in the development. Pedestrian walkways can be placed away from the setbacks of each unit that accomodate driveways, so that driveways can be made shorter. Small lots can be laid out so that they are wider than they are deep, to

allow two-car garages and more curb spaces (though this would reduce potential savings in reduced street and servicing costs).

--Lot landscaping.

With smaller lots comes a more intensive use of the outdoor private space, and with plantings for privacy comes reduced direct sunlight on the private space. Both these considerations make conventional lawns impractical for zero lot line houses. It is recommended that outdoor areas of intensive use be covered in pavements or decks, and that shaded areas be planted in ground covers which require less sunlight.

--Maintenance of zero lot line wall.

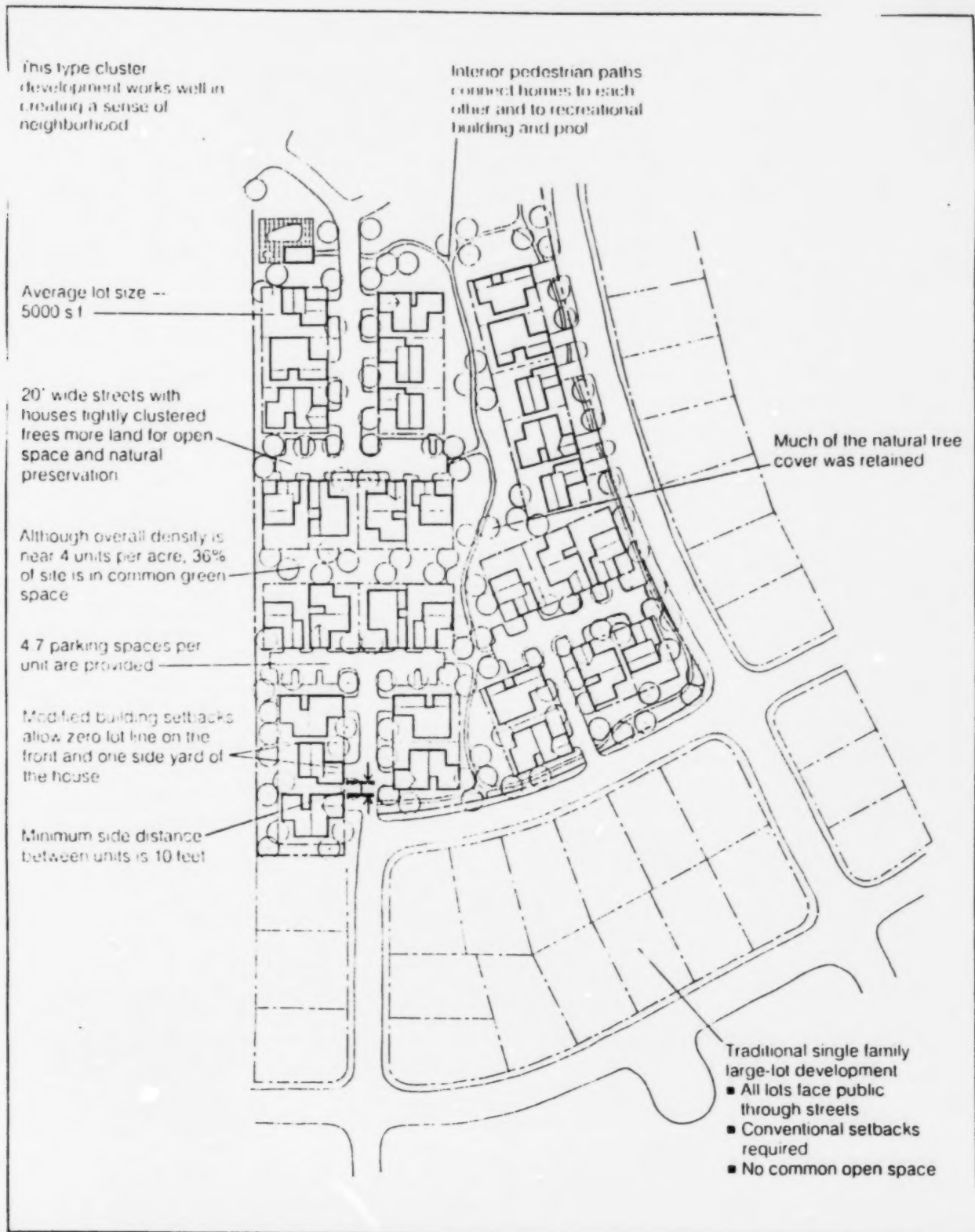
Because one wall (or two walls) of a zero lot line house is placed on the lot line, some provision must be made for access to that wall for maintenance through the adjacent property. Most zero lot line ordinances and developments include easements for the purpose of maintenance, and also easements for roof overhang and drainage of storm water. Some ordinances or owner agreements specify limited materials and/or colours permissible on walls placed on lot lines.

--Surrounding property values.

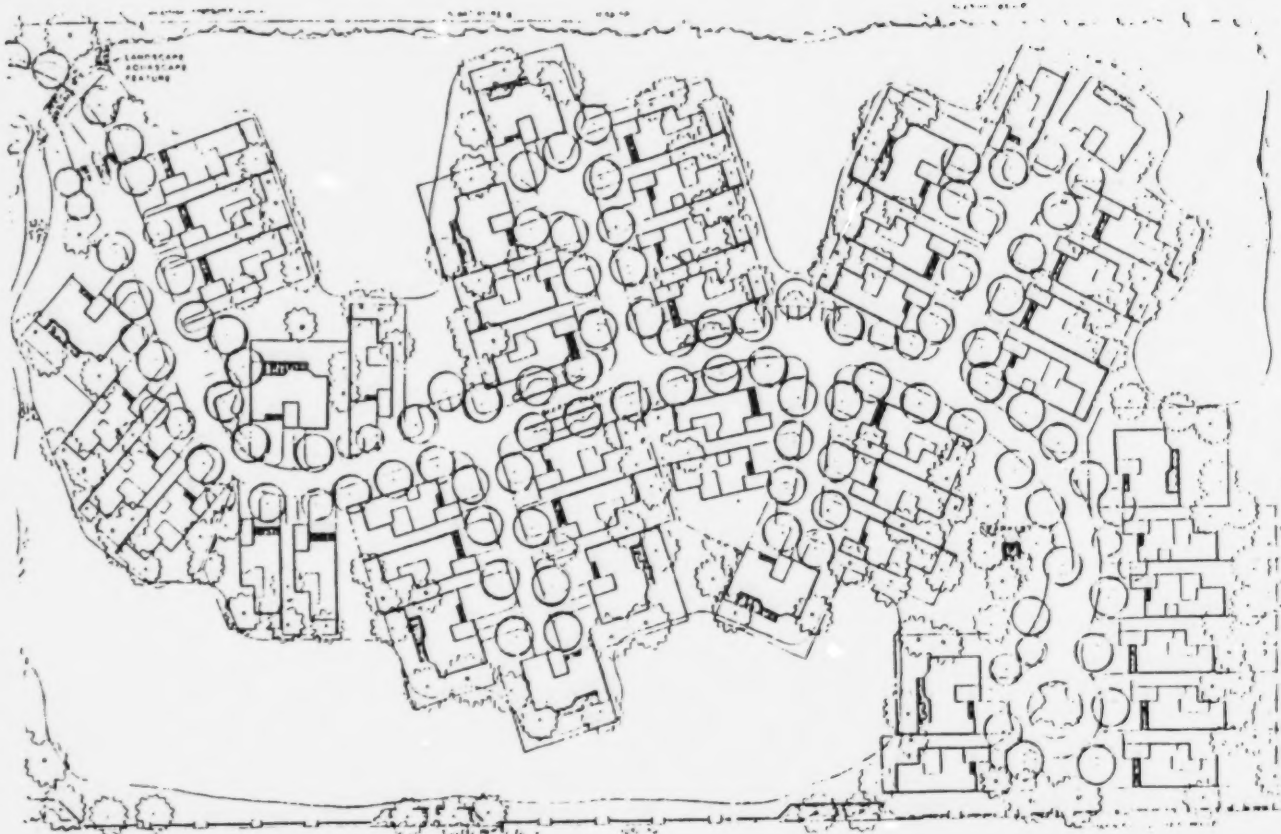
Concern is often expressed that higher density, small-lot detached housing will depress property values of adjacent conventional-lot detached housing. It has been found, however, that well-designed and attractive small-lot developments will not depress property values, especially if these developments form a buffer between conventional detached housing and still higher density multi-family housing forms.

Illustrations of zero lot line designs:

- 4a, 4b, 4c. Three plan views of small zero lot line developments: one showing a built development in Oregon and annotated with comments concerning desirable design features, another showing a built development in Florida, and another showing zero lot line houses on a cul-de-sac street.
- 4d, 4e, 4f. Three illustrated articles from Professional Builder, each of which shows zero lot line developments with design solutions to narrow frontage problems.
- 4g. Description and illustration of an innovative irregularly shaped zero lot line design which permits more usable space in yard.



Hyland Hills, No. 7, Beaverton, Oregon. This early 1970s development employed many of the design techniques discussed in this section. Houses are sited on the front and one side lot line and are clustered around "T" cul-de-sacs. A variety of housing designs and yard setbacks are used. Clustering these ZLL units on lots that average 5,000 square feet permitted 36 percent of the site to be put into common space, over four parking spaces per unit, and 20-foot wide streets. (Adapted from *Planning for Housing: Development Alternatives for Better Environments*, copyright 1980, National Association of Home Builders, Washington, DC 20005, page 52.)

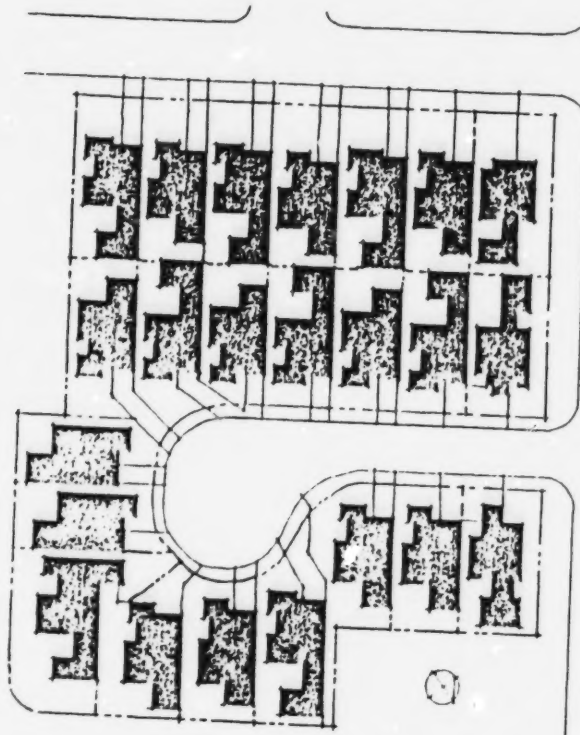


La Vallee Development, Dade County, Florida, 1981. Clustering these 40 ZLL units on a 16-acre site allowed nearly 50 percent of the site to be put into common open space. In many instances, setbacks on these lots, which range in size from 5,000 square feet to 9,000 square feet, are staggered.

4b. Source: Welford Sanders, Zero lot line development, page 9.

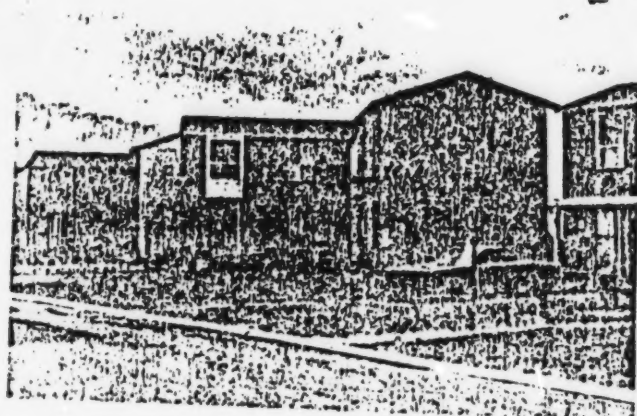
4c. Source: CMHC, Residential site development advisory document, page 35.

Zero lot-line housing on 10 m x 21 m lots at 42 units/ha.



Net densities of 17 to 42 dwellings per hectare can be achieved through zero lot-line siting. [24, 25] In this instance, the dwelling is located on a property line with the normal narrow side-yards amalgamated into one useable yard so that the total lot size can be reduced without loss of amenities. Zero lot-line siting uses land efficiently and reduces the cost of providing services; however, it calls for comprehensive planning, relating the individual dwelling to its outside space and neighbouring buildings. In most cases, it is also necessary to register a maintenance easement on the adjacent properties.

Zero lot-line housing at 29 units/ha.



4d. Source: Professional Builder (July 1986),
pages 76-77.

Easement Innovation Makes For More Attractive Small-Lot Houses

One of the ways to build detached houses at a higher density is to go with zero-lot-line site planning.

But sometimes these houses just look too narrow. The narrow side entry is often dominated by the garage, which takes up most of the front elevation.

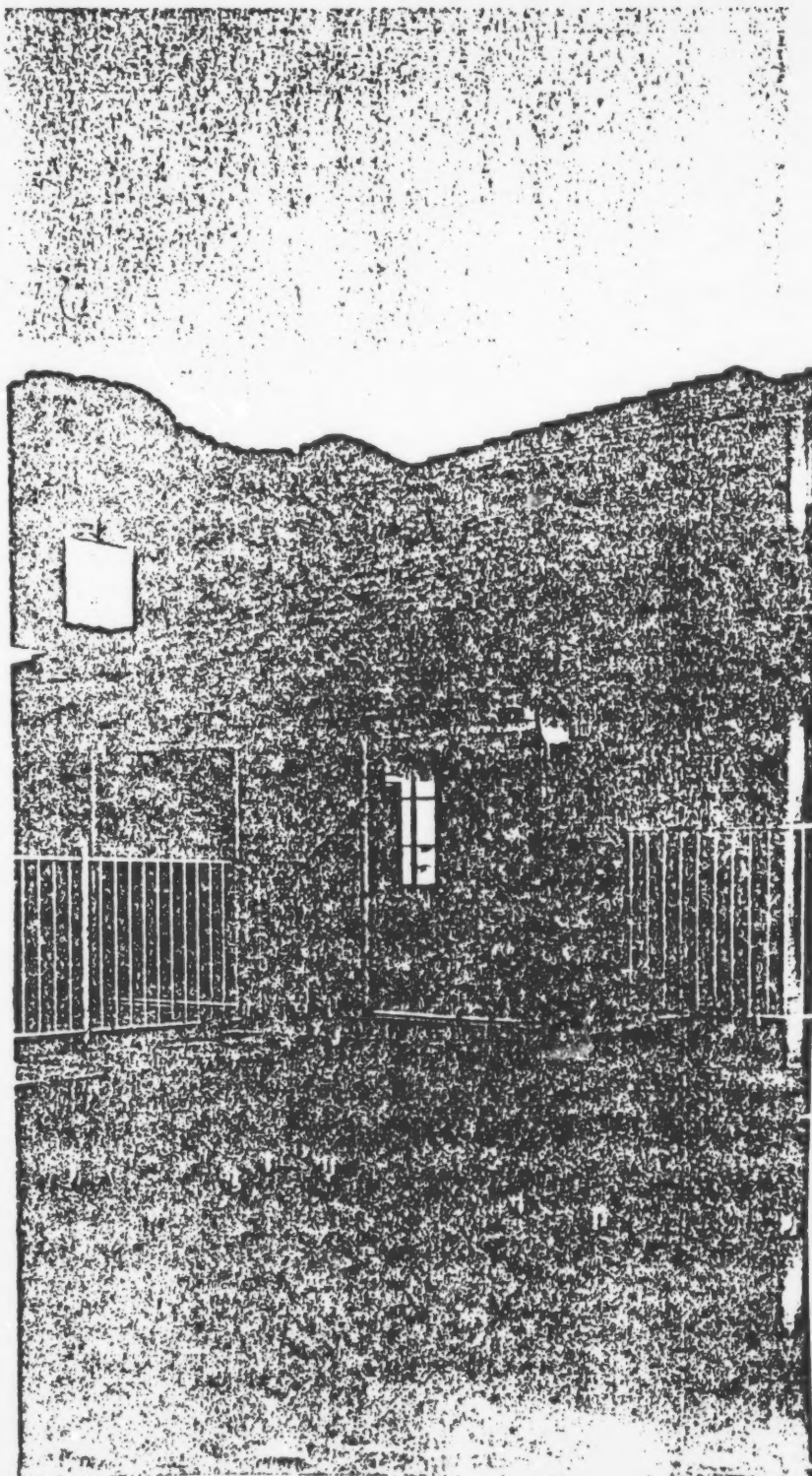
The offset zero-lot-line concept, however, helps alleviate that problem by increasing the width of the front elevation. Paragon Homes used this concept with its Villa Balboa development in Tucson, Ariz. Density is six units to the acre.

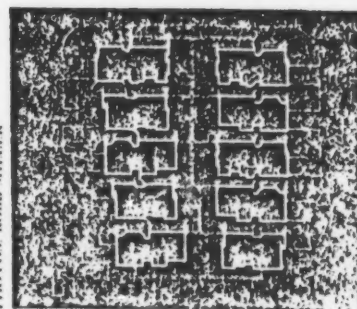
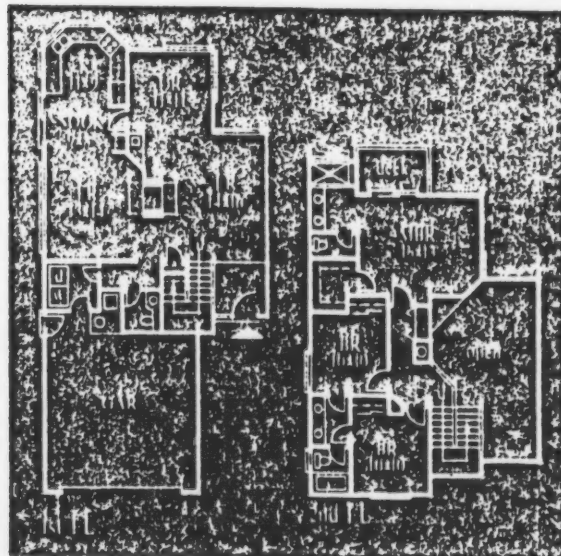
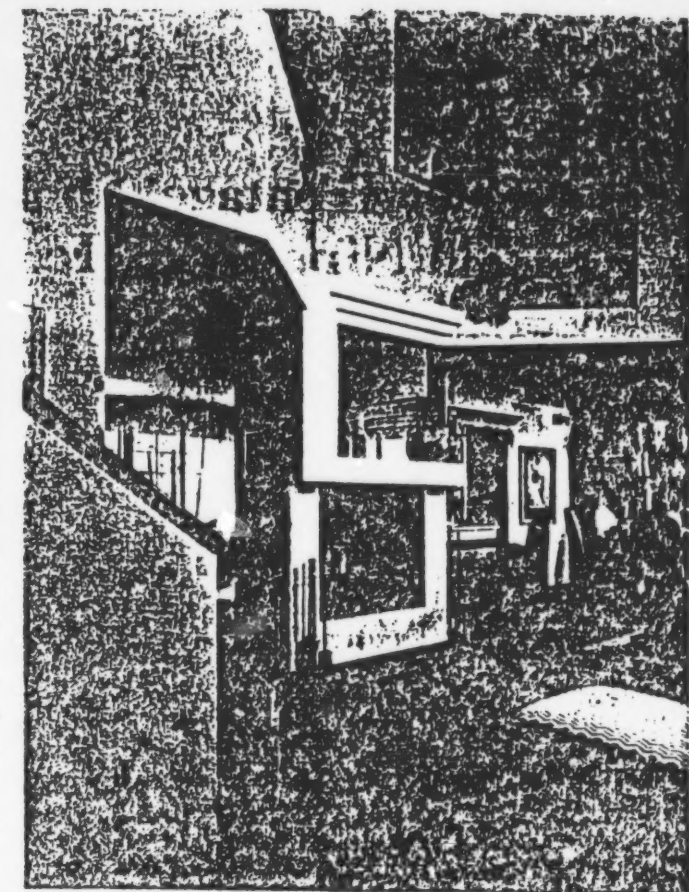
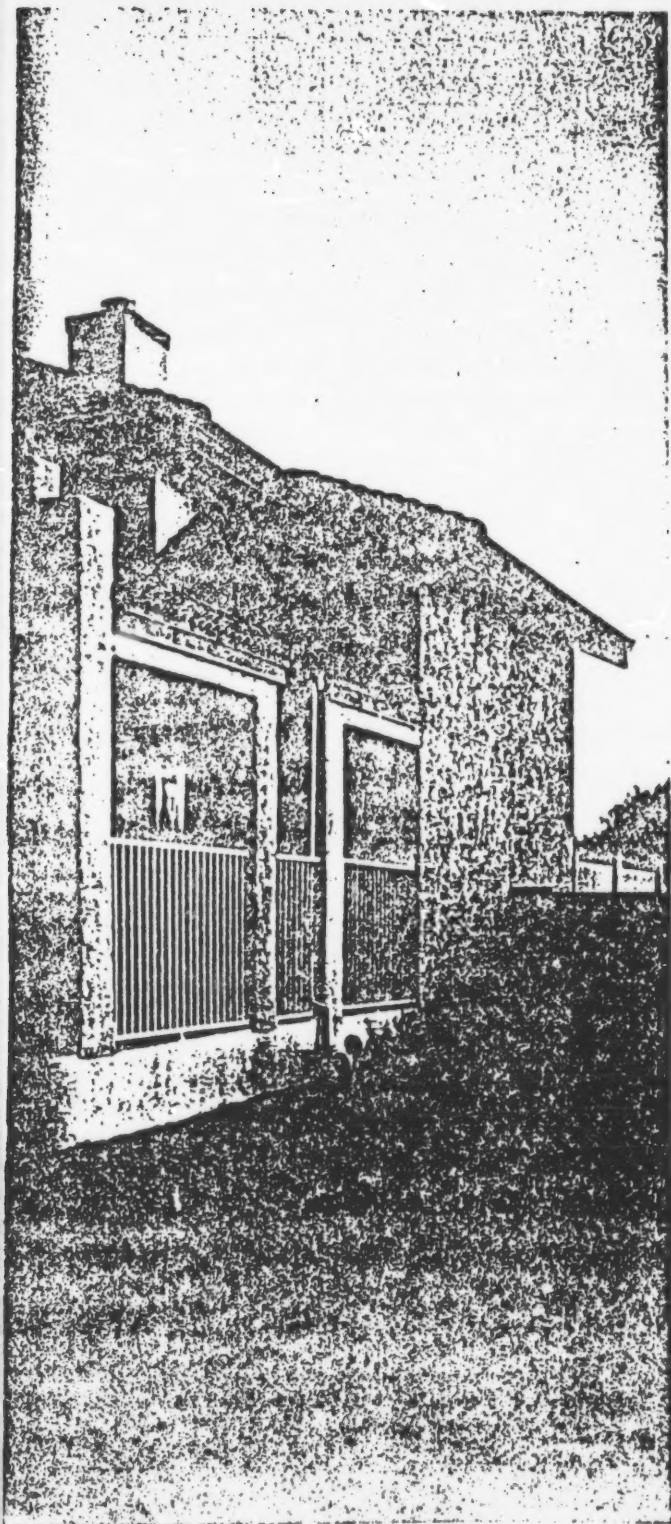
In this concept, also known as the offset easement program, an easement of five feet is granted from the next property to accommodate the entry. The garage then accounts for 20 feet of what is a 40-foot-wide front elevation. If the lot had been a typical zero-lot-line design, the elevation would have been 35 feet wide. Beyond the entry the easement switches to the other side of the house so there is a 10-foot-wide side yard there.

So this concept produces a very grand 20-foot-wide entry, said Rick New of Berkus Group Architects in Newport Beach, Calif. And switching the easement to the other side of the house enables the architect to create a long diagonal view toward the windows facing the side yard on the other side of the house. That diagonal view makes the space seem bigger.

The offset concept can work within a standard zero-lot-line site plan so the density can be six units to the acre or more, New pointed out.

Pricing units from \$84,300 to \$121,100, Paragon sold 46 in 10 months to a group evenly divided among younger professionals, empty nesters and retired people. Sizes for the houses ranged from 1184 square feet to 1721 square feet. Hard construction costs were \$32 a square foot. □





An entry portico adds appeal to the front elevation of this offset zero-lot-line plan. Interiors were decorated by Pamela Hoffman Interiors of Woodland Hills, Calif.

PHOTOS: ROBB MILLER

Wider Frontage, Shallower Depth Yield Nine Units To The Acre

To achieve high density with detached housing, a builder has to either reduce the width of the lot or the depth of the lot. Many builders have chosen to reduce the width.

But Lane/Kuhn Pacific of Newport Beach, Calif., chose instead to reduce the depth so its zero-lot-line houses could have a wider and more pleasing front elevation.

The 50-foot width of the 3300-square-foot lots at The Cottages at EastLake Shores in Chula Vista, Calif., gave the houses excellent street frontage, said David Kuhn. They do not have the narrow, bowling-alley look that some houses on small lots have, he noted.

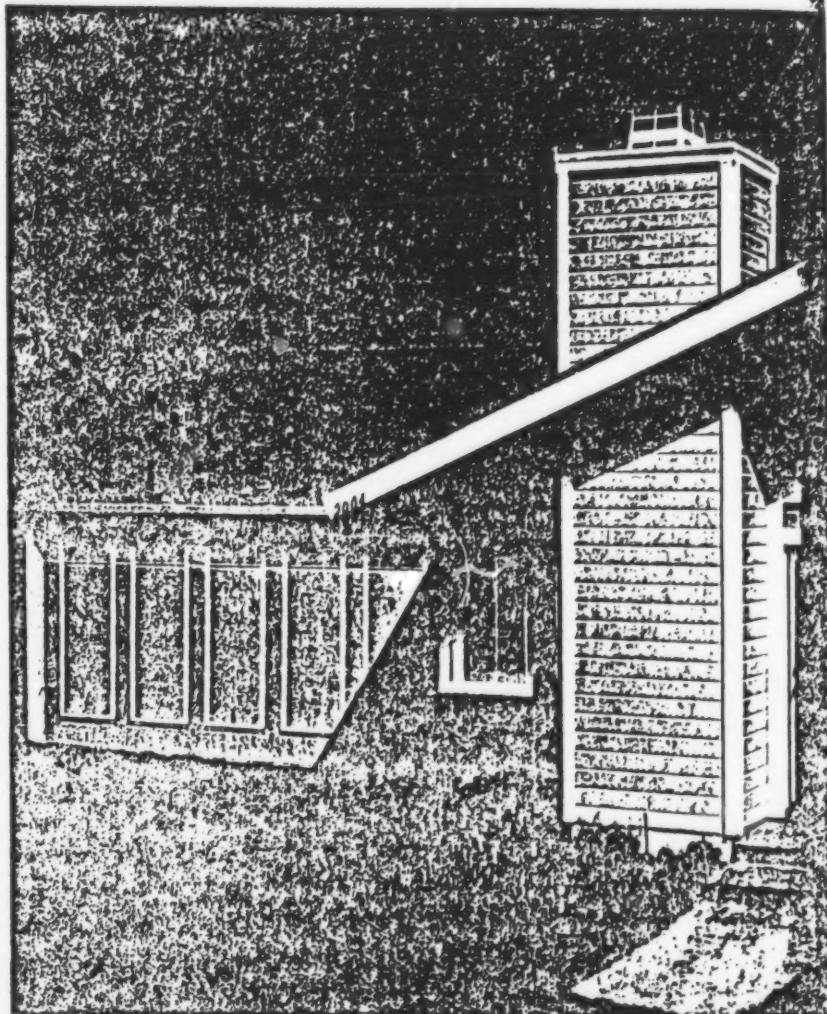
Yet the units at EastLake still have a density of nine units to the acre. The only change is that there are about one-third more streets and utilities because of the wider frontages, Kuhn said.

Buyers liked the resulting look created by the wider lots at The Cottages at EastLake Shores. The builder sold 24 houses the first day the project opened in April. In the following nine days, a total of 88 units were sold. Plus Lane/Kuhn Pacific placed 900 names on a waiting list.

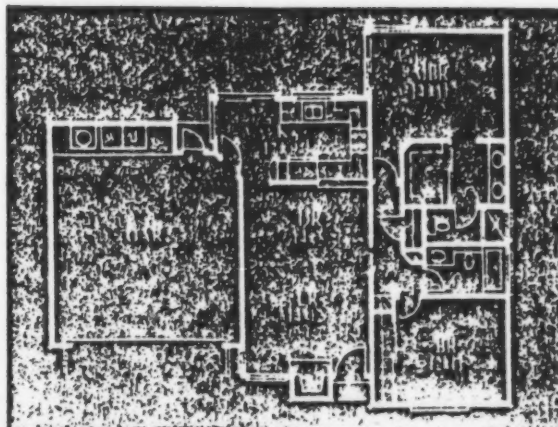
Lane/Kuhn Pacific was one of eight builders that reported brisk sales at the opening in April of EastLake, a new community being developed by Lane/Kuhn Development Co.

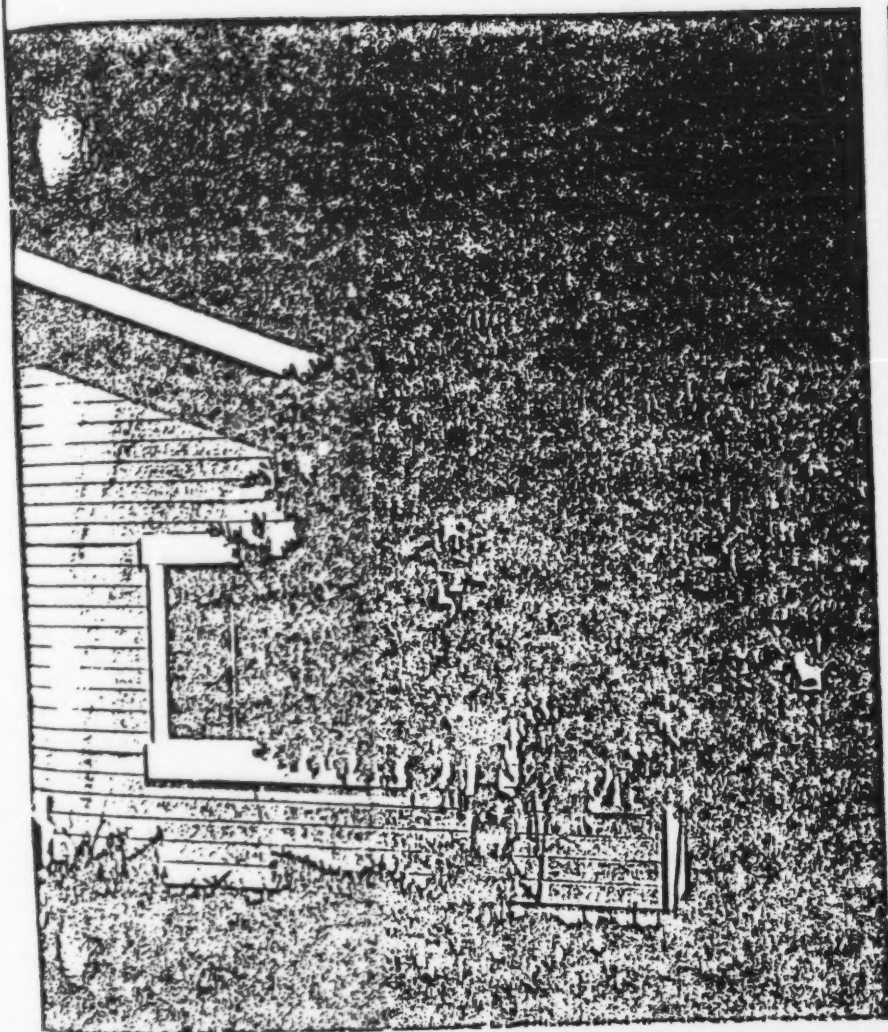
Designed in a New England cottage style, the houses at EastLake range in size from 912 square feet to 1452 square feet. Prices in the first phase ranged from \$81,900 to \$104,900. The units were designed by Pulaski/Arita Architects, Newport Beach, Calif.

Some housing observers think that the small-lot programs with wider frontages will be the next trend in Southern California for affordable, detached housing. □

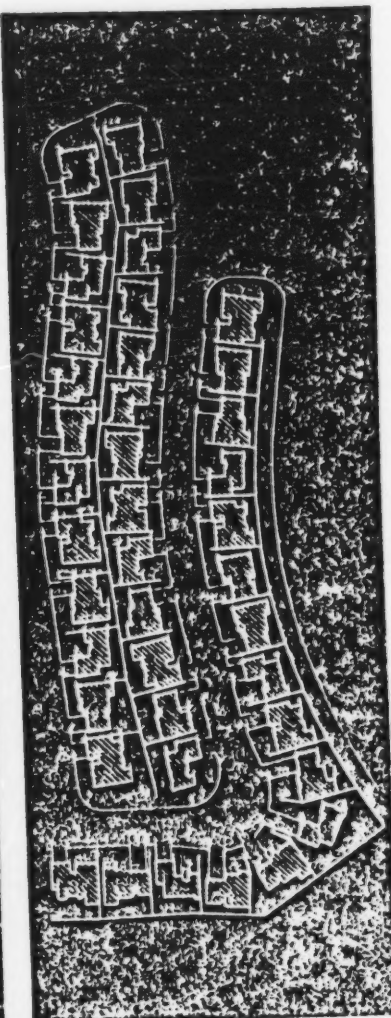


A wider street frontage was obtained with 50-foot-wide lots at The Cottages at EastLake Shores in Chula Vista, Calif. Vaulted ceiling makes living area, opposite, seem more spacious.





PHOTOS MIKE MUCKLEY



Lots for these houses are 50 feet wide, wider than most zero-lot-line sites. But depth is shorter—just 66 feet. Density is nine units to the acre.

How To Reduce Garage's Impact On A High-Density Streetscape

Independently, two top designers reach the same conclusion: to improve curb appeal at six to the acre, reduce depth, not frontage.

By William H. Lurz, Associate Editor

Two housing design innovators—California architect Art Danielian and Colorado land planner David Clinger—are pushing, independently, similar ideas for solving the problems of high-density detached housing.

"Achieving density of six units per acre—with detached housing in zero-lot-line, Z-lot and sawtooth land plans—is great for the builder's bottom line, if he can sell the houses," Clinger said.

"Unfortunately, in many parts of the country, that's getting harder to do. When you get a bunch of zero-lot-line projects in a community, you create a monster," he said. "The garage door becomes the enemy of man. It dominates front elevations and the whole streetscape."

"Narrow lot, high-density housing also creates parking problems,"

said Art Danielian. "With a two-car garage on a 40-foot frontage lot, for instance, there's only room for one car to park in front of the house."

"With today's families having two, three, or more cars, and guests visiting, there's just not enough parking," said Clinger. "And municipalities are becoming increasingly concerned about it as they get more experience with zero-lot-line communities."

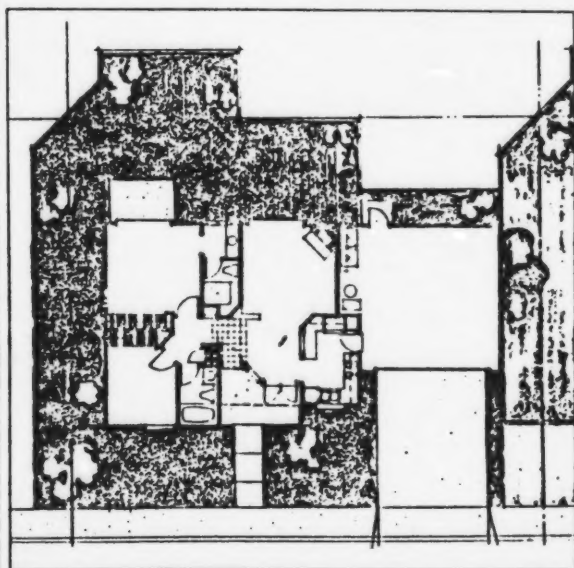
By contrast, both designers' ideas for wide, shallow lots allow parking for at least six cars: "two in the garage, two in the driveway and two on the street," Danielian said. "It really helps with both parking and traffic flow. But it does a lot more. It also improves the marketability of the product. Front elevations are much more impressive. We are now working on

a new line of wide lot houses for The Bren Co. in Orange County (Calif.) and the elevations are just sensational. They're going to look like \$200,000 homes and sell in the \$140,000 range. They don't call it 'curb appeal' for nothing," Danielian said.

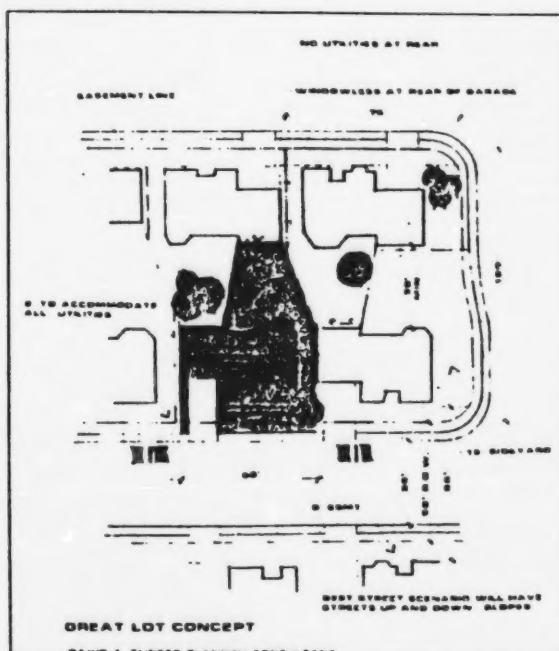
Both Clinger's "great lot" and Danielian's "wide lot" call for frontages in the 60-foot to 70-foot range and densities of 5½ to seven units per acre. "To get higher densities than that, you'd have to go to less than a 60-foot frontage, and that becomes an entirely different design statement," said Danielian. "You're really back to a narrow lot."

Perhaps the first of the new breed of shallow lots is Lane/Kuhn Pacific's Cottages at EastLake Shores in Chula Vista, Calif., which

Continued on page 44.



Danielian's "wide lot" (left) has 67-foot frontage and 50-foot depth. Clinger's "great lot" is 60-feet by 60-feet, with backyards woven in zipper pattern.



GREAT LOT CONCEPT

How To Reduce Garage's Impact On A High-Density Streetscape

Continued from page 43

employs 66-foot lot depths. Density is nine units per acre (See page 00 of this issue.) However, frontages are only 50 feet, so the lots are still deeper than they are wide.

"This is really a marketing concept," Clinger said. "Turn the house and lot so the long dimension is to the street, and buyers are going to go for the perceived value of that big front elevation."

Clinger admits that wider lots mean more street and thus, more front-end infrastructure cost. "We calculate the cost increase at 15 percent," he said. "But I think consumers will be more than willing to pay the tradeoff for the increased frontage. And these houses will sell faster, so costs will be lower."

Danielian, who has several projects on the drawing board utilizing his "wide lot" concept, calculates the increase in initial infrastructure costs at \$1200 to \$1500 per house.

Danielian's wide lot shows 67

feet of frontage to the street, with the house set back 15 feet. Depth is 50 feet. Density is just over six units per acre. The small backyard is concentrated by using easements to take away space from behind the garage and add it adjacent to the house's major living space.

Clinger's "great lot" has 60-foot frontage and 60-foot depth, but the lot is not square. Rather, backyards are staggered and woven together in what he calls a "zipper pattern."

Useable outdoor space is concentrated behind the major living space of the house and facing the blank wall of the neighbor's garage at the back lot line. If there is a bedroom over the garage, its window must face to the front. Privacy fencing shields the yard on the sides. All services are brought in at the front via an eight-foot utilities easement.

Both designers were adamant that architecture and land plan-

ning must be closely integrated to manage sightlines and preserve privacy. "After all, you're still dealing with high densities," Danielian said. "Shallow backyards create the potential for privacy problems. You have to design every detail very carefully."

Clinger increased the depth of his backyard to overcome a problem he has seen with zero-lot-line projects in northern climes. "Those 10-foot sideyards just don't get any light in the winter. No matter what the street pattern, the sun is just too low on the horizon for many months of the year. With the great lot, there's enough depth for that backyard to get some sun."

Both designers called on builders to exercise complete control of the streetscape—by taking responsibility for all front landscaping. "It's only wise to make sure those front elevations look great," said Clinger. "It's their most important marketing advantage." □



Proposed streetscape for Danielian's wide-lot, shallow-depth concept.

Zigzag Plan Makes Room For A Pool

The zigzag, zero-lot-line plan works for the Pasadena Pool Homes in South Florida.

Pasadena Homes principals Leonard Miller and Adolph Berger and the company's Pinebrook Homes division president, John Arbib, doubled the normal density to obtain six units to the acre at Pembroke Pines South, west of Fort Lauderdale.

Architect Quincy Johnson of Boca Raton designed the project so it looks and functions like single-family detached homes, yet makes maximum use of each homesite.

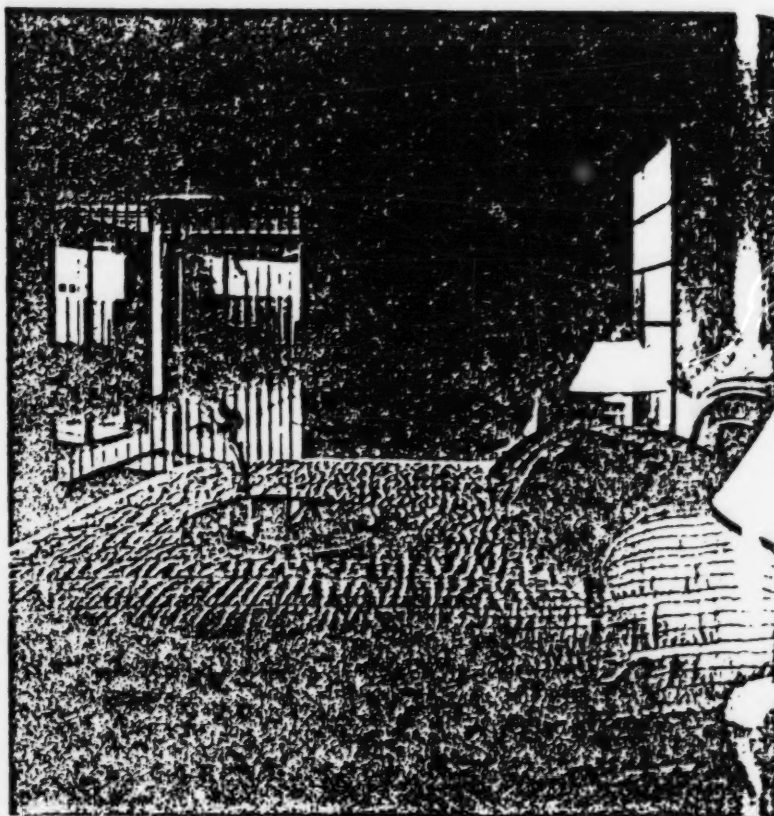
The zigzag approach has each house touching both side-lot lines. The design maximizes use of interior space and concentrates outdoor space in rear yards to allow installation (if desired) of patios, pools or spas. Yet prices are still less than the cost of a typical single-family detached home with pool sited on a larger lot.

Each home has a side yard. The neighboring house's adjoining wall, which has no openings, becomes a privacy wall. Views from inside the house looking outside are widened and, from the street, houses offer a broader front facade.

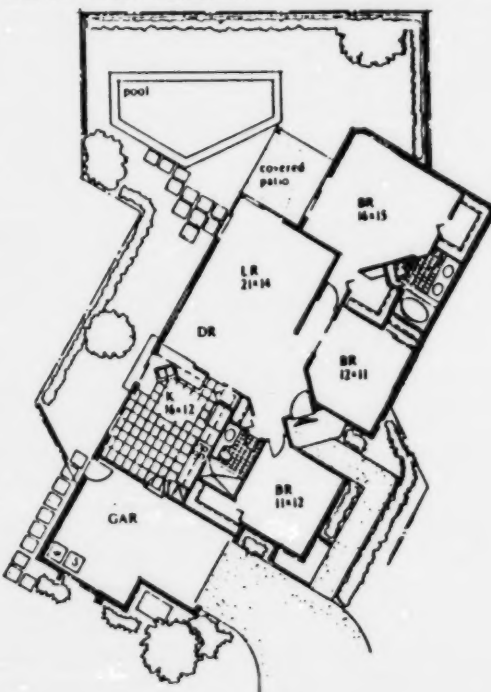
In effect, the design eliminates one side yard and puts the extra space on the other side of the house.

The 18.25-acre parcel at Pasadena Pool Homes ultimately will contain 110 units. Improved lot costs were \$18,000, not including the cost of fencing, landscaping and overhead. Lots with water exposure or on the golf course carry a \$10,000 premium. Hard construction costs (labor and material) ran \$31.50 a square foot.

The project opened for sales in April 1984. By early February, the builders sold 43 units. Prices are \$82,900 for a 1088-square-foot home; \$86,900 for a 1230-square-foot unit and \$92,900 for a 1370-square-foot unit. The Cartagena, largest of the three, shown here, has accounted for half the sales. Purchasers are empty nesters and young, upwardly mobile persons. □



PHOTOS: MARTIN FINE (interiors)



Pasadena Pool Homes on Z-lots give a wider view from the interior of each home. Bedroom, above, looks onto the pool/patio. Skylight in bathroom brings in light to overcome absence of window on the lot-line wall. Interior design was done by Modernage in Lauderhill and Miami.

5. CLUSTER DEVELOPMENTS

Just as zero lot line developments show a re-thinking of the conventional house-lot configuration, cluster developments show a re-thinking of conventional lot siting. Most conventional housing developments divide land into approximately equal lots (with the exception of park, school, and commercial areas) and assign these to private ownership. Cluster subdivisions, however, group private lots in smaller areas (clusters) and leave large areas of open space under common ownership.

Cluster developments may range in size from a few dwellings to a subdivision. On a small scale, cluster developments resemble zero lot line housing (or simply use alternative arrangements of several zero lot line houses): for example, four detached houses might be placed on a tract of land equivalent to four lots in a conventional development, but be grouped very close to one another in the centre of the tract, with physical and visual access outwards to relatively more open space. On a larger scale, clustering of units allows a very flexible site-unit relationship: attractive natural features can be preserved, or effective, livable open space can be created through site layout and landscaping.

Advantages of cluster developments

The chief advantage of cluster developments is that they allow the most efficient development of land for housing. On most development sites some land cannot be built on cost-effectively, because of grade or drainage or soil type. Cluster developments can be designed to leave such areas in open space, and the most buildable areas of sites can be efficiently used. Also, sites which could not be developed cost-effectively to conventional standards because of grade or drainage can be developed using dwelling clusters. Further, conventional site development requires the clearing, grubbing, and grading of the whole site. Cluster developments require less site preparation, since the developed sections cover less area. Sites for cluster housing can be developed more cost-effectively.

Similarly, site servicing costs are reduced in cluster developments. Since housing units are grouped together, all services can be provided more efficiently: less road length, and shorter water, sewer and utility runs are possible.

Maintenance costs of cluster developments are also lower. More concentrated housing units allow savings, for example, in road maintenance, snow removal, and refuse collection.

Finally, cluster developments offer great potential for innovative site and dwelling design. Because there is great flexibility in the provision of open space, natural features of sites can be retained and enhanced, and the integration of open space and housing accomplished creatively, attractively and effectively. Existing natural vegetation can be preserved, and natural site features can be adapted to recreational use.

Disadvantages of cluster developments

Cluster developments do not always produce affordable housing. Even though site development costs are potentially lower in these developments, land costs may remain high for two reasons: 1. cluster developments are not necessarily developed to higher densities than conventional housing, but simply use a similar amount of land more effectively, and 2. site development and servicing savings may be outweighed by landscaping costs. Cluster subdivisions in the U.S. have often been developed as housing for middle or upper income groups; beautiful sites have been retained and enhanced, and attractive housing units built in high concentration but low density for design-discerning and up-scale markets. This, however, is not a necessary feature of cluster development. Such developments could produce affordable housing if densities were increased, and sites were chosen for cost-effectiveness (see, for example, the cluster site plan reproduced below from Sanders, The cluster subdivision).

Another inherent cost to cluster subdivisions is the regulatory process. Most zoning ordinances make no provision for such strongly alternative site developments, and the process of winning approval for cluster developments can be time-consuming and costly.

A final disadvantage, or, more accurately, problem with cluster developments is that legal and social provision must be made for the maintenance of the development's open space. This space is not public, nor is it private (in conventional ways), so means of assuring its maintenance must be found.

Illustrations of cluster developments.

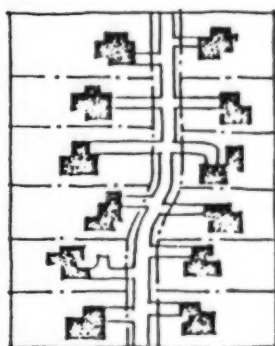
- 5a, 5b, 5c, 5d. Brief descriptions and layouts of small scale clustered streets.
- 5e. A comparison of conventional and cluster subdivisions.
- 5f. A "typical" plan of a cluster neighbourhood.
- 5g. (i and ii). Two alternative site plans, showing a subdivision developed according to conventional single-family dwelling site standards and according to a higher density cluster site design. The cluster design uses higher-density housing forms (duplexes and zero lot line housing) as well as conventional lot detached houses, and provides much more open space.
- 5h. Two alternative site plans presenting comparison of conventional and cluster subdivision designs.
- 5i. Illustration of two lakefront developments, one using conventional lot design and the other using clustered dwellings. This illustration shows the benefits of cluster development in the enhancement of natural features of a site.

Clustering

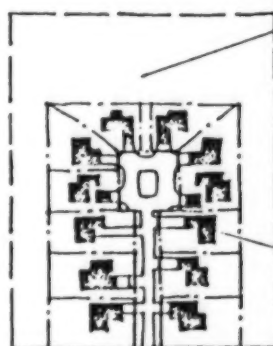
In cluster development, structures are arranged in closely related groups around courts, cul-de-sacs, or short loop streets. Clustering makes the most efficient use of the natural amenities of the land, preserves open space for community use, and reduces development and community service costs. Cluster development goes a long way toward solving the worst land and energy problems: high development costs, high energy costs, lack of natural green space, monotony of endless rows of rectangular lots, and no

sense of neighborhood or community.

Clustering is an old concept, but it is not used enough. In the past, development land was abundant and the cost of providing housing and energy was relatively low. People accepted their dependency on long auto trips for everyday needs. They were also willing to pay for over-extended, underemployed utilities. Now the energy crisis and the high cost of providing municipal services demand that clustering become the main theme of new residential developments.



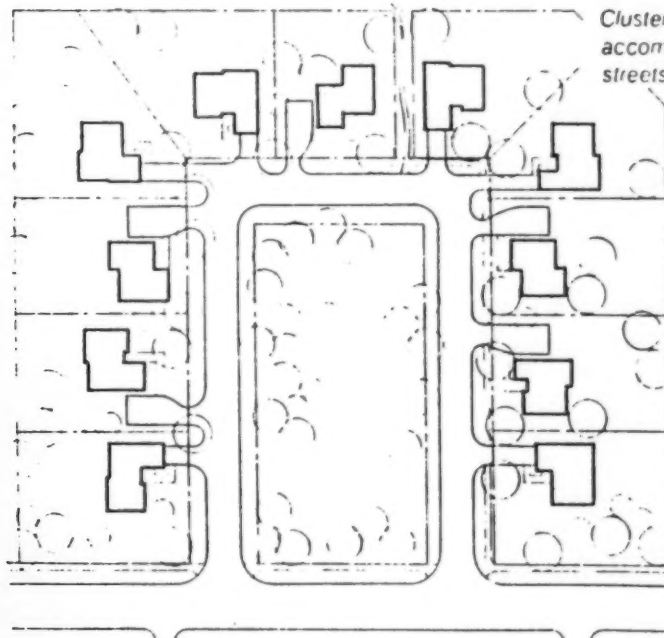
Conventional
Subdivision Development



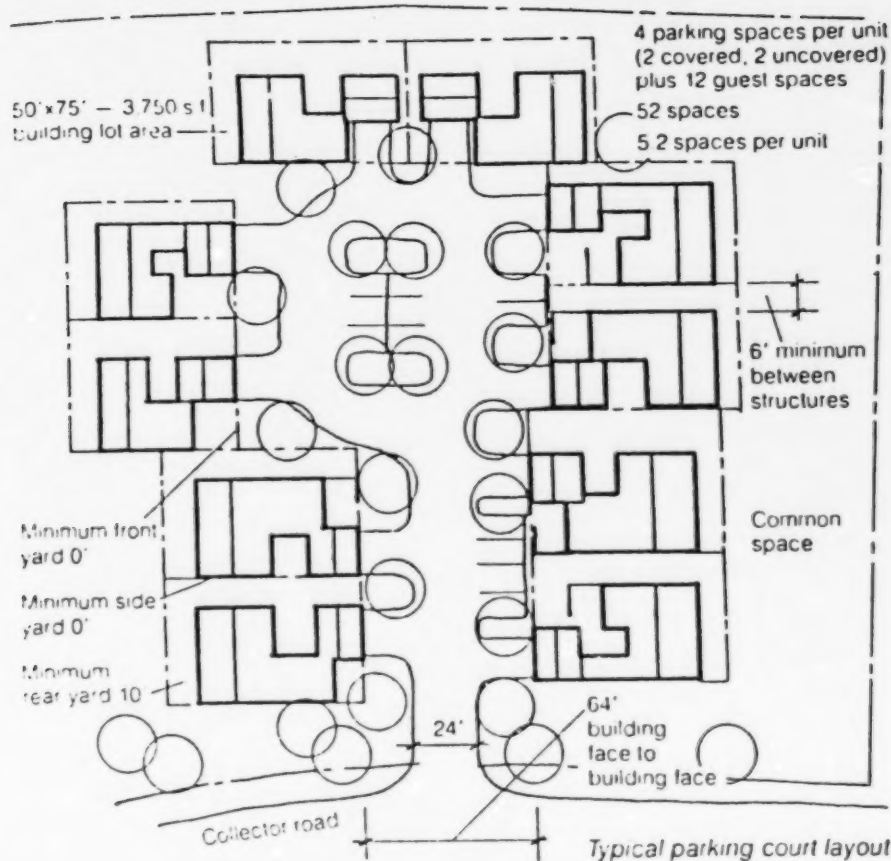
Cluster Development

Instead of all land being subdivided into individually owned lots, some undeveloped land is preserved as open space for community use

Structures are arranged in closely related groups around cul-de-sacs, courts, or short loop streets



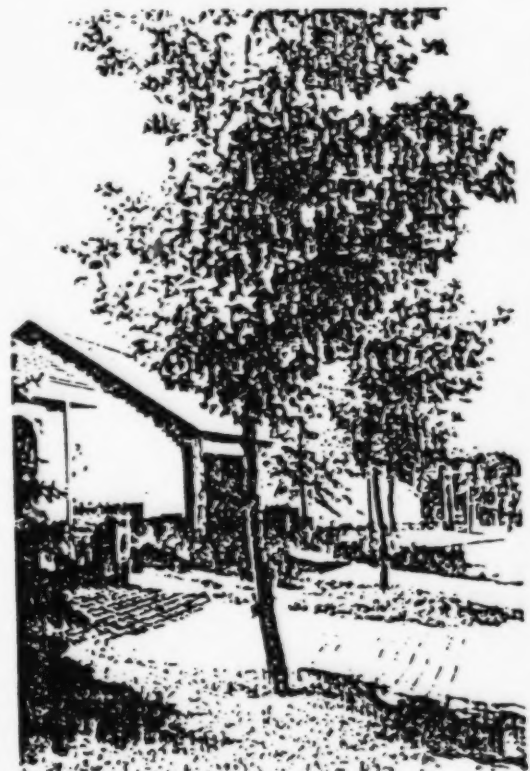
Cluster development can be accomplished on short loop streets



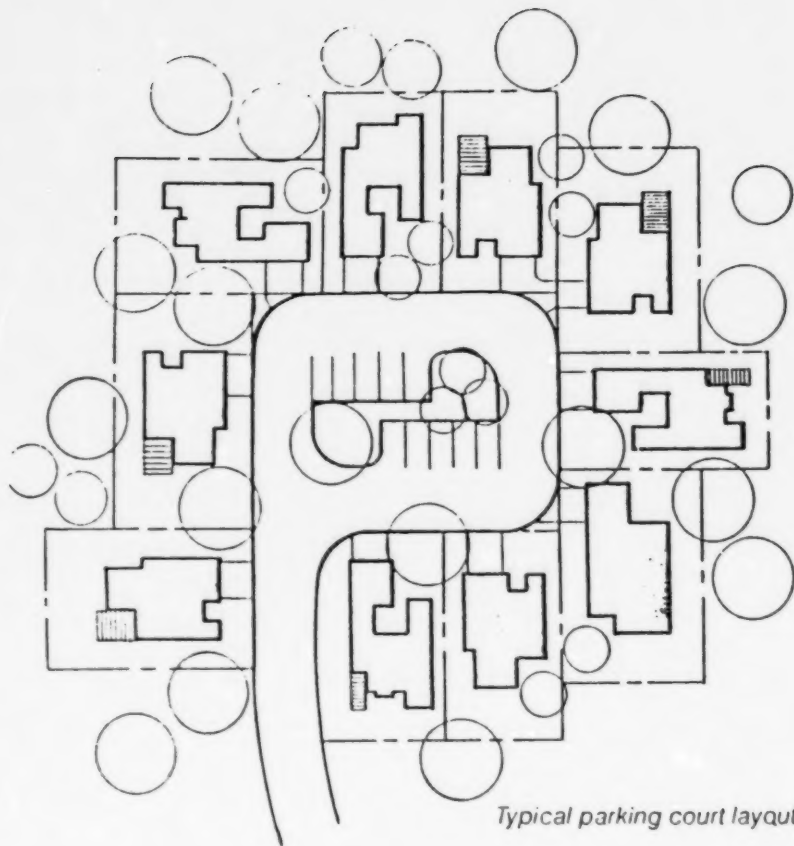
Sycamore Patio Homes
Chesterfield Village,
St. Louis County, Missouri

Developer —
Sachs Properties, Inc.
Chesterfield, Missouri

Architect —
Jones, Mayer and Assoc.
St. Louis, Missouri



5b. Source: Land Design/Research, and NAHB, Planning for housing, page 57.



Typical parking court layout

Medford Commons Medford, N.J.

Medford Commons, a 45-acre residential project with 90 clustered detached houses in Medford, N.J., is built at the same two-unit per acre density as the surrounding residential areas. But there is a dramatic contrast between the adjacent conventional single family homes and the new clustered units.

Clustering at Medford Commons freed half of the site for attractive green belts and for small lakes which are part of the site's storm drainage system. Such clustering also enabled the builder to reduce land development costs by \$2,500 to \$4,000 per unit.

Builder —

Bob Meyer
Medford, New Jersey

Planning, Landscape Architecture —

RSWA, Philadelphia, Pa.

Architecture —

Richard Martin Assoc.
Philadelphia, Pa.

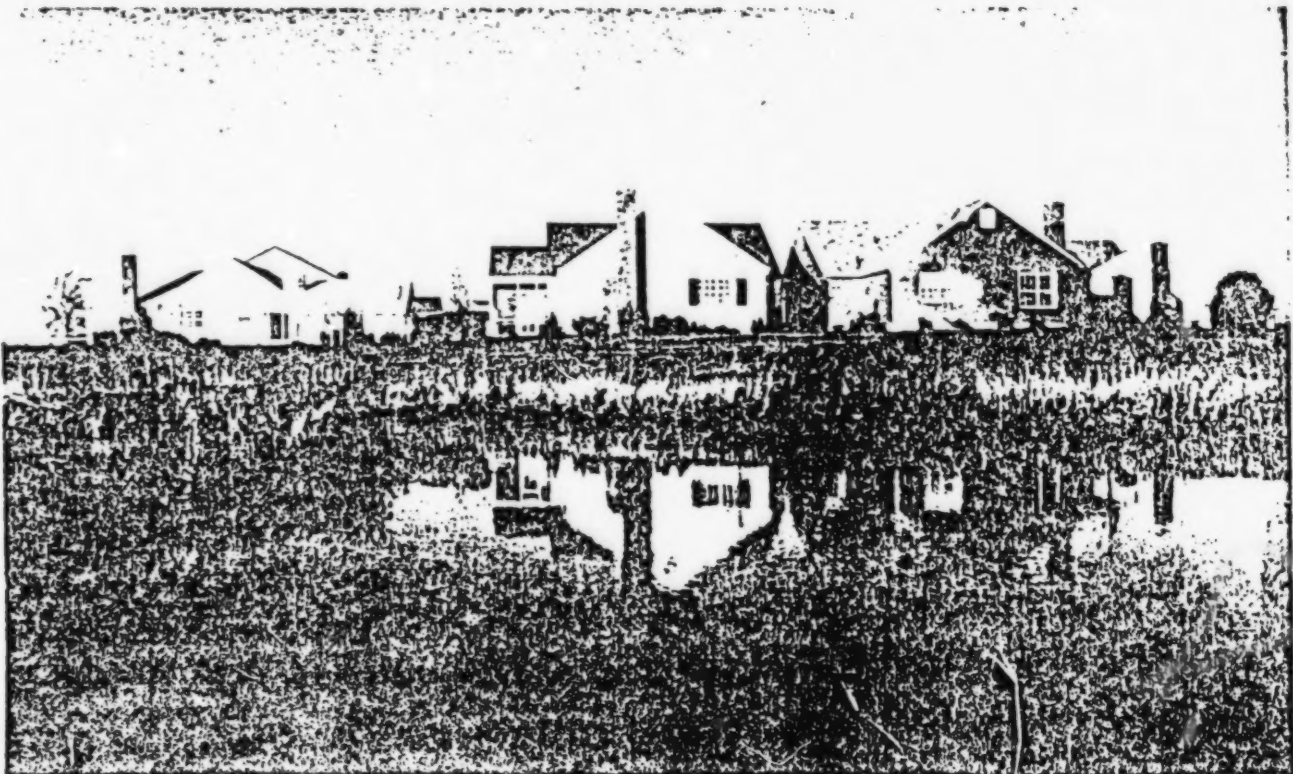
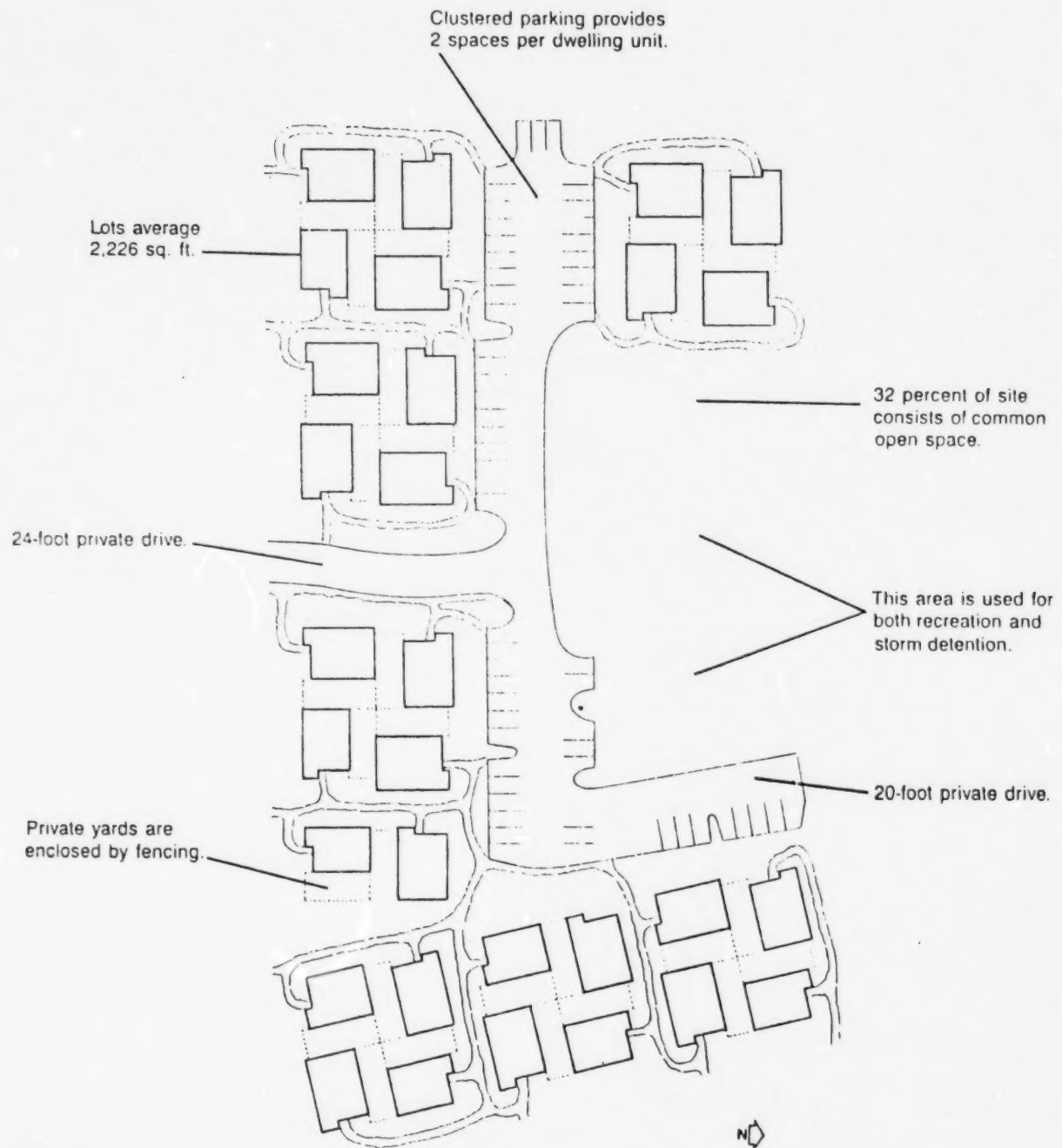


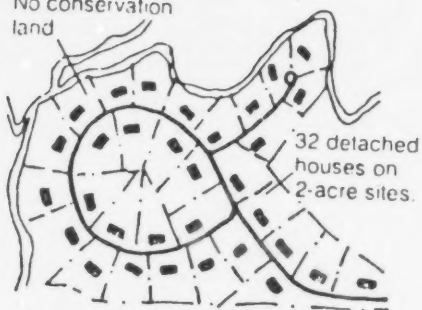
Photo by Hugh L. Loomis

Figure 5. Site Plan, The Cottages Development, Olympia, Washington.

5d. Source: Welford Sanders, et al., Affordable single-family housing, page 19.



No conservation
land



Conventional Subdivision Plan

63 acres total,
44 acres reserved as
perpetual conservation land



Cluster Plan

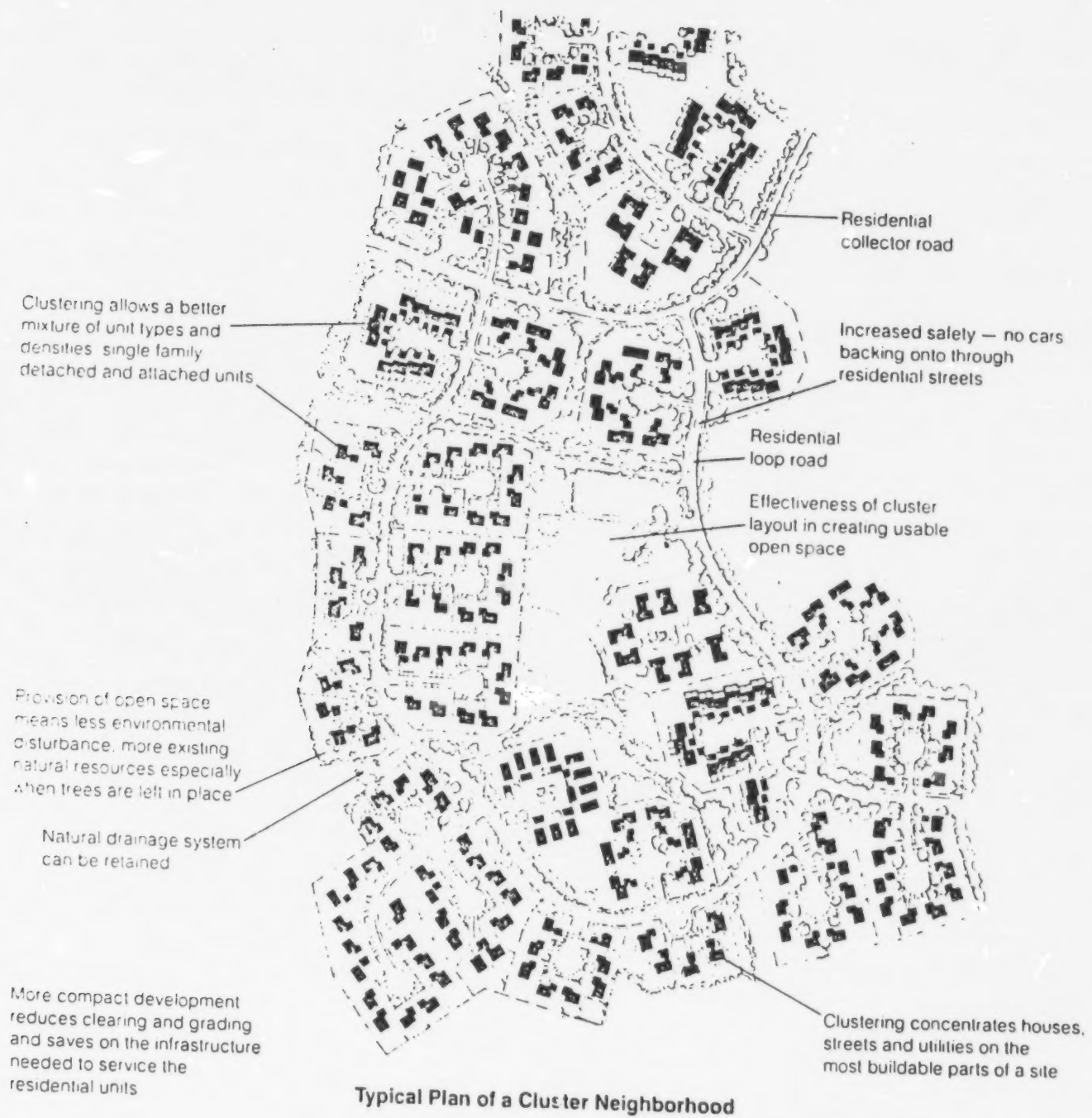
Higher density
generates added
gross tax revenues

Fewer school-age
children (result
of different unit
types) saves in
educational costs

Reduced maintenance
costs, less roads
to plow, to repair

Comparison between Conventional Subdivision Plan and Cluster Plan





Typical Plan of a Cluster Neighborhood

5f. Source: Land Design/Research, and NAHB, Planning for housing, page 31.

FIGURE 1. CONVENTIONAL SITE PLAN



© Copyright 1976 National Association of Home Builders

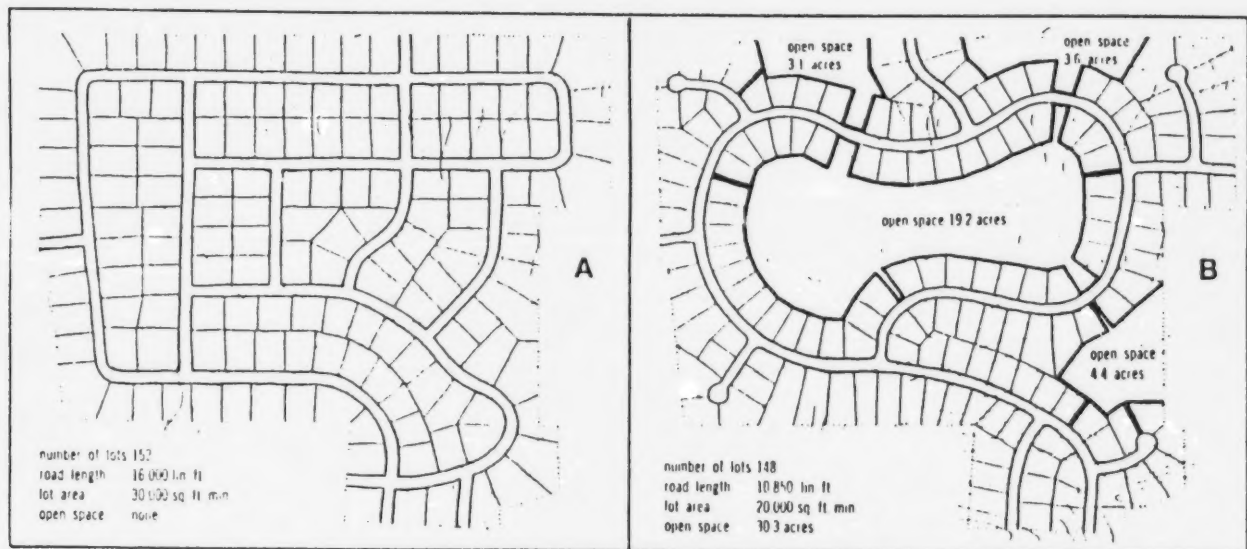
5g (i). Source: Welford Sanders, The cluster subdivision, pages 2-3.

FIGURE 2. CLUSTER SITE PLAN



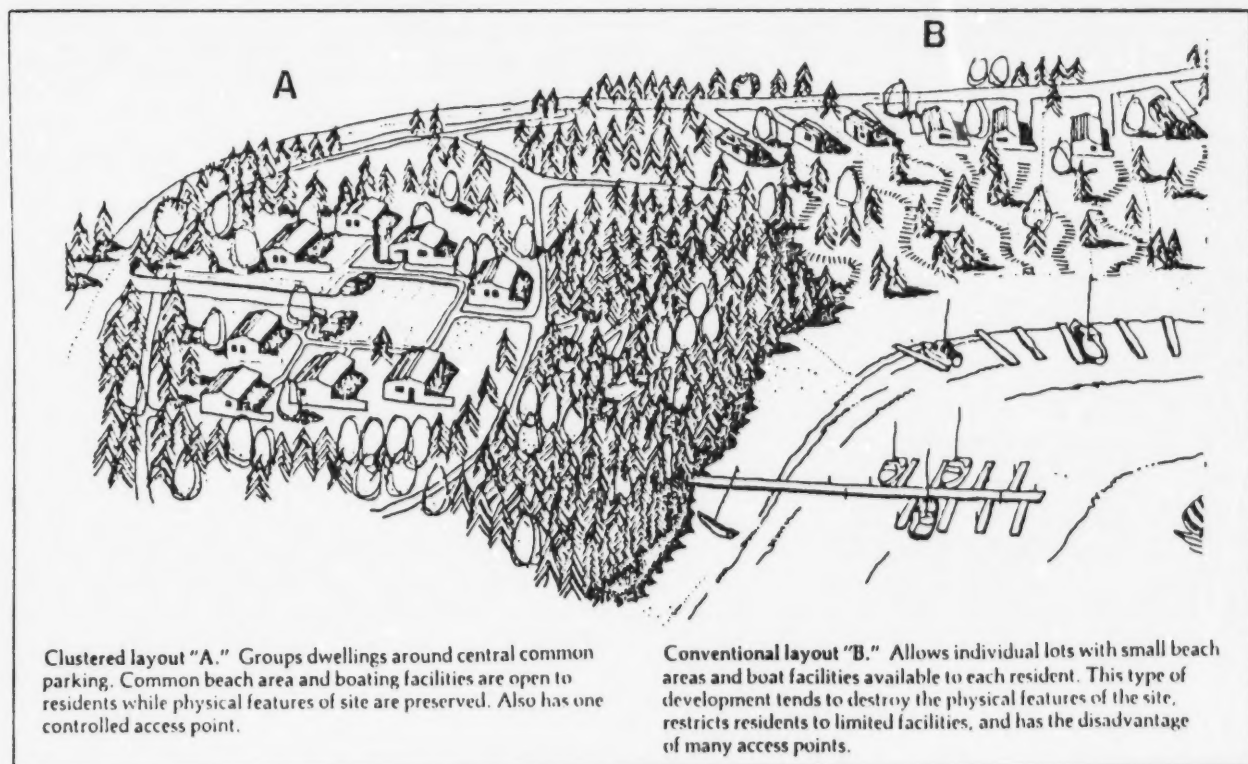
© Copyright 1976, National Association of Home Builders

5g (ii). Source: Welford Sanders, The cluster subdivision, pages 2-3.



A COMPARISON OF CONVENTIONAL (A) AND CLUSTER (B) SUBDIVISIONS

5h. Source: Welford Sanders, The cluster subdivision, page 18.



LAKEFRONT DEVELOPMENT

5i. Source: Welford Sanders, The cluster subdivision, page 17.

6. DESIGN REQUIREMENTS FOR LIVABILITY

Problems inherent in higher density housing forms have been discussed above.

Any site plan for higher density housing of any form, whether attached or detached, must address site features which affect the livability of dwellings in these developments.

Site requirements for livability include:

--increased protection of visual privacy

techniques: -fenestration
-fencing
-plantings
-minimum overlook criteria

--increased protection of acoustical privacy

techniques: -wall and floor design
-fenestration
-fencing
-plantings
-berming

--increased integration of indoor and outdoor living space

techniques: -physical and visual openings
concentrated on dwelling sides
facing private space
-living and eating interior spaces
adjacent to exterior private
space

--increased open space

techniques: -lot-building configurations
-cluster
-semi-private open space
-small [neighbourhood] park
and large park criteria

--landscaping

techniques: -natural site features for
open space
-privacy plantings
-acoustical and visual berming
-dwelling unit design adapted to
grade of site

--visual identity of individual units

techniques: -varied elevations and facades
-varied front setbacks
-offset lots
-design of access

--street layouts and traffic

techniques: -hierarchical street standards
-shorter streets
-curved streets
-cul-de-sacs
-pedestrian walkways

--design and control of parking

techniques: -off-lot parking
-rear alleyways to on-lot parking
-wider, shallower lots
-pedestrian walkways away from
driveways
-garage design to minimize visual
impact on streetscape
-landscaping of parking areas

Resources

The scope of this report does not allow a detailed discussion of these requirements and techniques, but several resources may be listed which do provide detailed discussion and propose design standards:

[Note: Location codes are those of the Starter Homes Bibliography]

Aasen Associates. Site planning criteria for high density housing. Final report. Ottawa: Canada Mortgage and Housing Corporation, March 1983. [ICURR: BG 144]

Beck, Robert J., Robert Rowan, and Pierre Teasdale. User generated program for lowrise and multiple dwelling. Vol. 1, Site design requirements. Vol. 2, House design requirements. Montreal: Centre du Recherches et d'Innovation Urbaine, Universite de Montreal, 1975. [OMH: 728.1 C397 v.1,2]

Central Mortgage and Housing Corporation. Site planning criteria. Ottawa: CMHC, September 1977. [OMH: 351.725 C397si]

Engstrom, Robert L., and Marc Putnam. Planning and design of townhouses and condominiums. Washington: Urban Land Institute, 1979. [OMH: 334.1 E57 (not found); ARCH: NA 7520 E53; MTL-MR: 711.58 E54]

Greater Vancouver Regional District Planning Department, and the Canadian Housing Design Council. A qualitative checklist for compact housing. Vancouver: Greater Vancouver Regional District Planning Department, February 1975. [OMH: 728.1 V223]

Harding, Michele, Kerry Wasserman and Andrew Zdanowicz. User study: zero lot line concept. Ontario Ministry of Housing, July 1975. [OMH: 711.5 H842]

Jensen, David R., and HOH Associates. Zero lot line housing. Washington: Urban Land Institute, 1981. [ARCH: NA 9051.5 J4]

Land Design/Research, and National Association of Home Builders. Cost effective site planning. Single family development. Washington: National Association of Home Builders, 1976. [OMH: 711.417 L253 (not found); ARCH: TH 437 L36 1976]

Land Design/Research, and National Association of Home Builders. Planning for housing. Development alternatives for better environments. Washington: National Association of Home Builders, 1980. [MTL-MR: 333.77 L12]

Ontario Ministry of Housing. Site planning guidelines for medium density housing. Toronto: Ontario Ministry of Housing, January 1980 [OMH: 728 061]

Untermann, Richard, and Robert Small. Site planning for cluster housing. New York: Van Nostrand Reinhold, 1977. [OMH: 711.6 U61]

7. SITE SERVICING

Increasing density is the major means to lower site costs of new housing. A second component in the cost of new housing, however, is the cost of servicing of residential lots, and these costs are significant. Beyond raw land costs in the price of a housing lot are the costs of sewer and water connections, storm drainage systems, roads and sidewalks, and electricity and telephone connections.

As in the case of conventional site planning standards, conventional site servicing standards are costly and inefficient, and contribute to the high cost of new housing. More cost-effective techniques of providing these services to new housing developments have been proposed, evaluated, and implemented.

Density and servicing

The most significant means of reducing site servicing costs is higher density. Sewer, water, electricity and telephone runs per unit are shorter and less costly when dwellings are closer together, and closer to front lot lines. Even though more linear feet of roads are required in higher density developments, the cost of these is less per unit than in conventional developments. Some higher density site plans--for example, clustered dwellings, cul-de-sac streets--allow even further reductions in servicing and road lengths.

In addition to savings through higher density, more specific cost-effective servicing techniques and standards have been developed:

sanitary sewers

- separation from storm sewerage
- reduced dimension standards
- increased distances between manholes
- curvilinear runs

storm drainage

- more on-site containment of storm water
(roof and footing drainage onto lot)
- catchbasins
- reduced standards

water mains

- doubled connections (one connection to main along common property line, branching to two dwellings)

roads

- hierarchical standards (different standards for streets of varying use, and strongly reduced width standards for streets servicing only a few units)
- alternative layouts (cluster, cul-de-sac)
- alternative materials and standards for curbing

walkways

- walkway routes away from streets (incorporated into open space, and allowing parking on smaller front setbacks)
- sidewalks on one side of street
- sidewalks only on collector streets

Resources

Again, the scope of this report does not allow detailed discussion or illustration of these techniques and standards. Most useful resources concerning reductions in site servicing standards and costs are as follows:

Canada Mortgage and Housing Corporation. Stormwater management technology systems demonstration in the City of St. Thomas. Canada Mortgage and Housing Corporation and Environment Canada, SCAT [Interdepartmental Committee on Sewage Collection and Treatment] Report no. 3. Ottawa: Canada Mortgage and Housing Corporation, November 1980. [OMH: 351.725 C397sto]

Federal/Provincial Task Force on the Supply and Price of Serviced Residential Land. "Lot servicing costs and standards." Chapter 8 in Down to earth. Vol. 2, Synthesis and summary of technical research. April 1978, pages 77-97. [OMH: 333.337 G815 v.2]

Ontario Ministry of Housing. Urban development standards: a demonstration of the potential for reducing costs. Toronto: Ontario Ministry of Housing, March 1976 (Second edition, 1983). [OMH: 333.38 060ud 2nd ed.]

Ontario Ministry of Municipal Affairs and Housing. Residential site design alternatives in small communities. Toronto: Ontario Ministry of Municipal Affairs and Housing, September 1981. [PPDB; OMH: 711.6 060r]

Paul Theil Associates. Comparative subdivision servicing study. Cost analysis of new techniques. HUDAC Technical Research Committee. Toronto: Housing and Urban Development Association of Canada, December 1979. [OMH: 690.586 H883co]

Paul Theil Associates. Design guidelines for residential streets. HUDAC Technical Research Committee. Toronto: Housing and Urban Development Association of Canada, 1977 [OMH: 690.586 H883de]

Paul Theil Associates. Update on sanitary drainage and sewage disposal methods. HUDAC Technical Research Committee. Toronto: Housing and Urban Development Association of Canada, 1978. [OMH: 690.586 H883up]

Paul Theil Associates. Zero increase in storm water runoff. HUDAC Technical Research Committee. Toronto: Housing and Urban Development Association of Canada, 1976. [OMH: 690.586 H883ze]

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Canada Mortgage and Housing Corporation. Residential site development advisory document. Ottawa: Canada Mortgage and Housing Corporation, February 1981. [OMH: 351.725 C397r]

John Bousefield Associates, and Paul Theil Associates. Lowering the cost of new housing. Ontario: Urban Development Institute, February 1976. [OMH: 690.031 U18]

Land Design/Research, and National Association of Home Builders. Planning for housing. Development alternatives for better environments. Washington: National Association of Home Builders, 1980. [MTL-MR: 333.77 L12]

Ontario Ministry of Housing. Urban development standards: a demonstration of the potential for reducing costs. Toronto: Ontario Ministry of Housing, March 1976 (Second edition, 1983). [OMH: 333.38 060ud 2nd ed.]

Ontario Ministry of Municipal Affairs and Housing. Residential site design alternatives in small communities. Toronto: Ontario Ministry of Municipal Affairs and Housing, September 1981. [PPDB; OMH: 711.6 060r]

Sanders, Welford. The cluster subdivision: a cost-effective approach. Chicago: American Planning Association, Planning Advisory Service Report Number 356, 1980. [OMH: 309.2606 A512 R.356]

Sanders, Welford. Zero lot line development. Chicago: American Planning Association, Planning Advisory Service Report Number 367, 1982. [OMH: 309.2606 A512 R.367]

Sanders, Welford, et al. Affordable single-family housing. A review of development standards. Chicago: American Planning Association, Planning Advisory Service Report Number 385, August 1984 [OMH: 309.2606 A512 R.385]